The Builder.

VOL. LXXVII. No. 2951. AUGUST 26, 1899.

ILLUSTRATIONS.

New Radcliffe Library, Oxford.—Mr. T. G. Jackson, R.A., Architect ..... *Double-Page Ink-Photo.*
The Petit Trianon, Versailles ..... *Single-Page Tone Block.*
The Palace, Versailles ..... *Single-Page Tone Block.*
The Chapel, Versailles ..... *Two Single-Page Tone Blocks.*
House at Saunton Sands, North Devon.—Mr. G. H. Kitchen, Architect ..... *Single-Page Ink-Photo.*
Waxwell Farm, Pinner: Additions.—Mr. W. H. Seth-Smith, Architect ..... *Single-Page Ink-Photo.*

Blocks in Text.

Sketches from South Kensington Museum :—
White Marble Fountain ..... Page 194
Part of Western Portal, Cathedral of St. Sauveur, Aix.... „ 195
Panel from a Balcony ..... „ 195
Waxwell Farm, Pinner. Plan. ..... Page 201

Sketches from South Kensington Museum (*continued*) :—
Magisterial Chair ..... Page 195
Brass Fire-Guard ..... „ 195
New Radcliffe Library, Oxford. Plan ..... „ 200

CONTENTS.

Versailles under the Republic 189
Reconstruction of Railway Viaducts in Cornwall 191
Notes 192
Sketches from South Kensington Museum 195
Michelangelo's Predecessors 196
Books:—H. Barton Baker's "Stories of the Streets of London"; Henry Wallis's "Egyptian Ceramic Art"; Theodore Andrea Cook's "The Story of Rouen"; George Newman's "Bacteria: Especially as they are Related to the Economy of Nature, to Industrial Processes, and to the Public Health"; "Amateur Gardening for Town and Country"; W. R. P. Hobbs's "The Arithmetic of Electrical Measurements"; W. A. Willis's "The Workmen's Compensation Act, 1897"; Charles E. Curtis's "The Valuation of Land and Houses" 198-200
Illustrations:—
Radcliffe Library, Oxford 200
Illustrations of Versailles 201
House, Saunton Sands, North Devon. 201
Waxwell Farm, Pinner 201
The Lincoln Health Exhibition 201
Competitions 201
Sewage-Sludge Disposal by Natural Agencies 201
Books Received 202
Correspondence:—
Aldershot Masonic Hall Competition 202
The Student's Column. Roads: Their Construction and Maintenance.—I. Materials (continued) 202
Obituary 203
General Building News 203
Sanitary and Engineering News 204
Stained Glass and Decoration 204
Foreign 205
Miscellaneous 205
Capital and Labour 205
Legal:—
What is a New Building? 205
Objection to Tramway Buildings 205
Case under the 1894 Building Act 205
Meetings 206
Recent Patents 206
Some Recent Sales of Property 207
Prices Current of Materials 207

Versailles under the Republic.

VERSAILLES is a good deal more accessible by road from Paris than in the days when it took the Paris mob seven or eight hours to escort "the Baker and the Bakeress" from Versailles to the Tuileries, on that memorable rainy day of October 6, 1789. The steam tram can be taken at the Pont de la Concorde or the Pont d'Iena, according to choice or convenience, and, passing on the way through the quiet little town of Sèvres, where the home-like appearance of the renowned porcelain factory seems rather at variance (not unpleasantly) with its world-wide celebrity, winds round eventually into the sacred "Place d'Armes" itself, within a stone's-throw of the palace gateway. One may note, after passing the fortification lines, that Paris, in spite of her generally prevailing stateliness within those lines, is spreading outward into small and undignified suburbs much after the manner of London; streets lined with small shops and tenements, and where the stone-fronted *maison de rapport* is unknown. The margin of the great avenue of several rows of trees, leading up to the Place d'Armes, on the lawns of which that motley assemblage encamped on the night preceding the doom of Versailles as a royal residence, is also invaded to a certain extent by small houses, which impair the original stateliness of the approach; and the Place d'Armes is lined on one side by open-air restaurants, offering the *déjeuner* which is almost necessary to fortify the body against the fatigue of even a cursory walk through the apparently endless galleries of the palace, and the mind against that induced by acres of bad painting, much of it indeed of great interest in a historical sense, but little of it of value otherwise, from the artistic point of view of the present day.

But though the phrase "a lumber of littleness," by which some one has characterised Versailles, is applicable enough to the contents of the palace, and though the building represents in some respects a great architectural opportunity lost, it is impressive enough as the architectural expression of an idea—that idea being the absolute and personal supremacy of the monarchy. Perhaps we could nowhere find a more striking instance of the manner in which architecture tends to symbolise the ideals of the society which erected it. Versailles palace is essentially a screen to a royal pleasaunce. Towards the entrance, and facing the road from the capital, the general effect of the building, with its vast paved court-yard in front, is inhospitable and uninviting; sombre without being grand. Pass through the hall of the ground floor entry, and you are in a kind of garden of Armida, a pleasure-ground on a scale such as has never been attempted elsewhere within the period of historical record; a realm of terraces, clipped hedges, ornamental gardens, statuary, basins, and (on occasion) fountains, so extensive that one may wander over it for a whole day without repeating one's steps. It is in this speedy transition from the stony courtyard in front to the gardens on the inner side that one realises the truth of the remark that the Palace of Versailles was one proximate cause of the French Revolution. It is the very architectural embodiment of despotic selfishness and self-indulgence, turning its blank side to the outer world, and enclosing behind its ramparts a paradise of enjoyment only open to the court and its hangers-on, formed at a cost such as must have appeared prohibitive to any ruler with a just sense of the proportionate rights of king and people. Artists indeed benefited by the scheme (though they did not in all senses make the most of their opportunities), but the general public were fleeced to pay them; and even some of the complaisant courtiers who looked on had begun to see, long before the crash of the Revolution, that Versailles spelled bankruptcy; witness the reply of one of them, recorded in Bachaumont's "Mémoires," to the question of Louis XV. as to what he thought of the new fountain displays—a criticism veiled under a discreet pun—"Sire, ils sont *impayables*."

The downfall of Versailles from its dignity as a royal palace was one of the most sudden and irrecoverable on record. That night and day of October 5-6, 1789, finished it apparently at one blow; the king and queen had to remove, or were removed, from it, and the half-rifled palace left deserted. During the Revolution period it narrowly escaped being sold as so much material. It might have been thought that such a palace, built ready to his hand, would have been a godsend to the more than regal ambition of Napoleon; but his practical mind realised that the expense of keeping it up would have been disproportionate to his other and greater schemes, and that the game was not worth the candle. It was left to "M. Le Roi Citoyen" to conceive the idea of utilising the building as a museum. In 1870, indeed, it was its strange fate to become the temporary residence of a sovereign whose advent there was certainly little contemplated when Versailles was planned. Now the present Republican Government is keeping it up and further developing it as a museum.

In a purely architectural sense, and apart from associations, there are suggestions to be reaped from Versailles—this among others, that the largest possible scale and the most unlimited expenditure will not supply the place of architectural judgment and genius. It is true that Hardouin Mansard, who was responsible for the greater portion of the palace, is generally regarded as an eminent architect, but whatever genius he possessed slumbered over Versailles. The popular guide-book idea, however, that it is the entrance front which is especially disappointing, and that you must go to the garden front to get the best impression of the palace, is a mistake. Whatever architectural effectiveness there is in Versailles resides in the grouping of the buildings facing the "Cour d'Honneur." The impression of small scale which it gives, in comparison with what one expects from the known size of the building, results partly from its great horizontal extent, and could hardly have

been avoided except by making the rooms of inconvenient and unsuitable height as living rooms, even for a palace. But there is a picturesque effect in the grouping of the buildings around and in rear of the vast expanse of paved courtyard, up the incline of which one can picture the ponderous state-coaches of the period lumbering heavily over the big stones, at the tail of six horses probably; and there is a certain dignity and impressiveness in the two columned and pedimented terminations of the principal wings, each with the proud inscription "À toutes les gloires de la France," thrust forward like architectural headlands into this sea of paving-stones. The French system, pursued both at this time and long after, of building the columns in shallow courses and with no care to reduce the joints to a minimum thickness, rather adds to the effect of the work; this is seen in the view of the chapel, where the angle of one of the wings is shown on a larger scale. The chapel itself, which makes a picturesque contrast with the character of the rest of the architecture, is really the only piece of fine and effective design in immediate connexion with the main building, and is so much more original and characteristic than the rest of the palace as to look like the work of another hand, though as far as we know there is no documentary evidence of this. Its exterior design is interesting as representing a treatment completely Gothic in feeling and in general structural design, though with classic detail, showing that the traditions of mediæval architecture still ruled to a great extent in the erection of places of worship; the three-aisled plan and the flying buttresses are frankly adopted in principle, though the buttresses take a very different form. Internally the design is much more classic in feeling and more orthodox in detail, but there is a fine simplicity and dignity about it. The view is taken from the royal tribune at the west end.

But with this the architectural genius of Versailles comes to an end. It seems extraordinary that in so vast a palace there was not even the attempt to produce a grand and imposing entrance. The courtyard in front keeps narrowing as the centre block is approached, producing an anticlimax of effect, and the centre doorway from the "cour de marbre" (so-called from its marble pavement) is only a secondary one, the main entrance being approached by the long narrow court between the north wing and the chapel, and the only merit of the entrance is the practical one that it is contrived so that a carriage could be driven right into the entrance hall, and the distinguished occupants could alight within doors. Not only is there no grand entrance hall, but there is not in the whole vast building a staircase of dignified and monumental design and scale; the principal staircases are only such as might be adequate to the dignity of an ordinary private mansion of considerable size.

Going through the entrance hall to the terrace and gardens, every architect must be struck at once by the fatal mistake of planning an immense façade on such an outline as this— The horizontal dimensions are truly colossal; 320 ft. across the centre projection, 500 ft. on each side of it, the centre block projecting 280 ft. But the effect of this immense length of frontage is totally ruined by the shape of the plan with its vast central projection, the result of which of course is that from no point of view can one see the whole elevation at once. Apart from this fundamental blunder, the whole design of this front is feeble in detail and ill-proportioned; the attic is too large for the order over which it is placed; the height is practically, to the eye, divided into three nearly equal portions, so that nothing is properly accentuated. Longitudinally considered, the design is equally defective in accentuation; the small projections near each end of the centre block have no meaning and are feeble in effect. But the worst fault of all in this portion of the design is its want of relation to the interior. The greater portion of the terrace front of the centre block is occupied on the first floor by the long and lofty "Galerie des Glaces," so called because the bays on the interior wall, corresponding to the windows on the exterior one, are filled with large mirrors. This gallery, which occupies the whole length of the façade except a square apartment at each end, is two stories in height, but there is not a hint of this on the exterior; the sham attic is carried along all the same. Thus the obvious hint for a broad and striking exterior treatment of the gallery is entirely thrown away.

The interiors of the State rooms are lavish in ornamental detail, the doors and their framework especially representing splendid and most costly workmanship, but all in the gingerbread taste of the Louis Quatorze and Louis Quinze period. The effect of the range of mirrors in the Galerie des Glaces one can imagine to have been brilliant enough when the room was crowded with people in the rich costumes of the period; but seen as it is to-day, as the lining of a huge empty room with an expanse of waxed and polished floor (there seem to be no pains spared to keep the floors in condition), it suggests to the mind only the idea of a huge restaurant.

The real greatness of the interior of Versailles resides in the associations called up by the immense series of distinguished personages and remarkable events (chiefly military) memorised in the crowd of portraits and battle-scenes with which the walls are covered. The effect indeed resides not for the most part in the paintings themselves so much as in their subjects. Here and there one comes on the work of an artist who has survived the effects of time and change of artistic taste and perception; but such oases in this desert of tawdry art are rare enough. The great "Galerie des Batailles," which occupies the whole first floor of the south wing, is a chamber of artistic horrors, many of them on an enormous scale, and one reflects with surprise and wonder on the fact that at a not very distant epoch Horace Vernet was supposed to be a great painter. His greatness is still appreciable by the square yard—one might say by the square rood—but hardly otherwise. And yet as one finds, in room after room, portraits of such a roll of Frenchmen famous in history, one half forgets the bad art in respect for the great names, and one begins to realise that the exterior inscription, "À toutes les gloires de la France," is hardly out of place.

As aforesaid, however, the real beauty, the artistic glory of Versailles, resides in Le Nôtre's great garden, which the long façade of the palace screened from the eyes of the profane world. There are some mistakes in detail here also, but as a whole it is a great conception. The wide terrace adjoining the palace, with its parterres and its two large square ponds or *bassins* in the centre, around which the Court took that melancholy afternoon promenade revived in M. Gérôme's picture at the Salon two or three years ago, furnishes the necessary formal base to so large a façade, and gives the best position for seeing the building as a whole; and if the parterres were kept up as they were meant to be it would still be a very fine piece of effect. The vista from the centre, first down the long wide gently-sloping lawn, and then across the round pond ("bassin d'Apollon") to the grand canal, which extends axially with the centre of the palace, is well intended; and the effect of the semicircle of great clipped hedges on each side of the steps at the top of the lawn, with the white statues sparkling in front of them, is admirable, as Mr. Fulleylove and other painters of gardens have discovered. The mistake is that the flight of steps leading down to the lawn is too sudden and steep in section for the situation, and on descending it you at once lose sight of the palace altogether, and do not "raise it" again (as they say at sea) till you are a good way down the lawn. The section of the steps should have been far more extended, two or three steps and then a platform, and so on; a point to be remembered by any architect concerned in laying out palace gardens and terraces on a large scale. Another defect is that the canal, which is more than a mile long, does not show its extent to the eye; you only realise it on looking at the plan of the grounds. It was no doubt with the intention of partly obviating this defect that Le Nôtre broke up its straight length by the open basin in the centre, whence two minor canals branch off as transepts; but probably the length of the perspective might have been made more apparent by bringing the trees at certain points close up to the canal, so as to get a diminishing perspective of height as well as of length in connexion with it. It is the hard formality of line which interferes with the effect of its length. No one, or no artist at least, who visits Versailles, should omit to look at the splendid carved marble vases which decorate the terrace in front of the palace; the two angle vases especially, of great size, and in the finest statuary marble, are of a beauty of execution almost worthy of Greek art. That on the north side is the work of Coysevox, the bas-reliefs representing the victory of the Imperial Powers over the Turks with the aid of Louis XIV.; that on the south, by Tuby, bears bas-reliefs referring to the peace of Aix-la-Chapelle. It is noteworthy that "Baedeker," amid its long list of sculptures in the gardens, many of them of very mediocre value, omits all mention of these vases, though as *objets d'art* they are about the best things to be seen at Versailles. It is the discreet "Baedeker" also which tells the visitor that the garden façade is the most imposing aspect of the palace, whereas it is the least so. It is melancholy to find these beautiful vases all scrawled over in pencil with the names of visitors; but the cockney, under one title or another, is to be found everywhere.

The idea of Le Nôtre's park or garden—an idea to be met with in other designs (on paper at least) of the same period, was, after

having formed a grand axial line central with that of the palace, to lay out the remainder on oblique lines branching from a centre near the palace, at the head of the long canal or lake, and reuniting in a *rond-point*, the "étoile royale," beyond the further end of the canal. Everything, of course, is in straight lines, but the oblique arrangement gives a certain mystery and puzzle to the lines of route, preventing the design from being too obvious and simple in character. The visitor walks through bosky alleys without knowing exactly where they will lead him, occasionally coming on an unexpected circular opening with a large fountain basin, almost an artificial pond, in the centre, over whose masonry rim the surplus water was to escape down steps, in mimic cascades, as the fountain played into the basin. Without going further into the details, which it would take a whole long day to follow out, one is rather concerned with the use which is now being made of this vast heritage of the ambition and love of display of Louis XIV. and his successor. And it is here that the present Government are making a mistake. They are treating, by a rule of contraries, palace and grounds respectively in exactly the wrong way. For the palace, the fact that some of the stone-work on the garden front was decayed has been made the excuse for scraping down and renewing the whole front; at least we presume this is the intention; at all events, in May of this year the whole south wing had been scraped raw, thus depriving this tame and mechanical architecture of the sole element of the picturesque which it possessed, that of surface and weathering. The French are so fond of this kind of operation on old buildings that one may presume they will not hold their hand till the whole garden front of the palace is "as good as new." Fortunately the courtyard front has escaped these mistaken attentions so far, nor does there appear to be anything in the state of the stone-work on this front to give excuse for such treatment here, and one may hope that it will be left untouched.

But what they are doing (or misdoing) with the garden front of the building is exactly what they are not doing, and ought to do, with the garden itself. Versailles is now essentially a public park, but it is very different from the ordinary public park consisting only of meadow and timber laid out with something of the irregularity of natural scenery. Versailles is a vast formal garden which is essentially a work of art, and makes no pretence to the effect of nature in any way. And a "Pleasaunce" of this kind loses all its effect as soon as it is allowed to get ragged and unkempt. This is becoming the case with the Versailles grounds. They are polishing up the palace and letting the garden get draggled. They should have done exactly the reverse; they should have let the building alone, except so far as replacing decayed stone, and polished up the gardens. Of course it may be replied that the annual expense of keeping such a vast formal garden in its proper state of finish would be very great. But is it not worth it? The Versailles garden is an almost unique thing of its kind; it was created at vast expense for the selfish pleasure of a monarch and his court, whom, however, we must not judge too harshly from the point of view of the present day; the prevailing ideas as to the rights and privileges of monarchy in the seventeenth century were different from those of the nineteenth century. In the vicissitude of things it has now become a place of enjoyment for the public; surely a beneficent Republican Government should provide that the public have the same enjoyment from it which the monarch had. Moreover, as a work of art on a grand scale it is worth keeping up in its pristine beauty; and considering the wealth of France and the amount of money which the Government can and do most liberally spend on the purchase and commission of works of art, they ought surely to be able to find funds to keep the gardens of Versailles in the condition in which alone a pleasure-ground of that type can have its full effect.

One interesting addition to the museum was in course of preparation earlier in the year, and has, we understand, been opened to the public during the last few days. This is a new collection, arranged by M. Nolhac, the curator, specially illustrative of the period of Louis XVI. and of the Revolution. It contains a number of drawings relating to that period, as well as portraits of Marie Antoinette and other eminent personages. It is reached by a small marble staircase which has been specially "restored" by M. Marcel Lambert, the architect.

About a mile from the palace are the Grand Trianon and Petit Trianon, concerning which the visitor will be told ("Baedeker" again!) that they are hardly worth while going out of the way to see. This may be true of the Grand Trianon, which looks like a big conservatory more than anything else; but the fact is that the Petit Trianon, from the artistic point of view, is one of the things best worth seeing at Versailles. The small oblong château presents no special originality of design, but it is perfectly pleasing and well-proportioned, and, with its terrace and steps, combines most harmoniously with the parallel lines of the lawn, the parterres, and the trees leading up to it (see illustration). The château is said to be undergoing "restoration," but at the time of our visit this was confined, apparently, to some repairs of the terrace and steps, and the building did not appear to have been touched. Here, as at the grand palace, the formal garden in front is not kept up to the mark; the grass is left to grow too long on the lawn, and the parterres are but in a slovenly state; but one can imagine the general effect of this little secluded paradise at the time when it was Marie Antoinette's favourite retreat. Internally, the first floor is a charming suite of rooms; though built by Louis XV. (from the designs of Gabriel), the furniture now there is no doubt what was put in by Louis XVI. for Marie Antoinette, as well as some of the decoration; it is in the best and most refined Louis Seize style, and of beautiful workmanship; the interior accordingly presents none of the gewgaw taste which pervades the great palace. Near the château is the "English Garden," or small park rather, laid out in the rambling *au naturel* style, with irregular winding walks, which represented the English taste of the day; the foolish little classical "Temple d'Amour" in one place contrasts oddly with the artificially rustic farmhouse and "Laiterie" in another, where Marie Antoinette and her ladies played at rural life as a relief from the stiff etiquette of the Court. A really charming little erection, not in the English Garden, but near the end of the formal garden of the Petit Trianon, is the octagonal pavilion with a domed roof called "Salle de Musique"; an ideal apartment for chamber-music for a small and select audience.

One may be truly glad that Versailles escaped the doom with which it was threatened during the Directory. Though, as we have observed, the garden is not kept up as it should be, all its features are there, and it would be still possible, with the necessary expenditure, to make the place all that it ever was, as far as the grounds are concerned, though we can no longer people them with the figures which must have seemed most appropriate to such surroundings. They had their day, and no doubt in a moral sense it is all right, and a subject of congratulation, that what was originally made for the selfish gratification of a few should now be a free holiday-place for the many. But as we return from the Petit Trianon to the exit at the palace, and pass one of the dead fountain-basins with its moss-green lip and steps, and come on a noisy group of the town boys of Versailles playing "rounders" in one of the glades adjoining the alley, one cannot repress a feeling of melancholy on contrasting this state of things with the former splendours of the place and its habitual denizens. How are the mighty fallen!

RECONSTRUCTION OF RAILWAY VIADUCTS IN CORNWALL.

SINCE the year 1869 a great engineering work has been progressing throughout the whole of what now constitutes the Great Western main line in Cornwall. The work in question comprises the replacement or reconstruction of the whole of the picturesque, but somewhat primitive, viaducts, erected in this part of the country before the immense possibilities of the railway system were fully realised. An idea as to the magnitude of the labour involved is furnished by the statement that between Plymouth and Penzance no less than forty-two viaducts exist, having an aggregate length of 5·83 miles, without taking into account Brunel's magnificent bridge at Saltash. All these viaducts are of considerable dimensions, length extending in one example to 396 yds., and height in another to 150 ft. above the valley. Further, it should be borne in mind that, in addition to problems of the kind naturally expected, the engineers have been subject to the condition that no interruption to traffic should be caused during replacements. In many instances this stipulation has been complied with, by the building of the new structures side by side with the old, but in others it has been necessary to reconstruct on sites already occupied by viaducts. The ingenious methods adopted for the performance of this apparently impossible task will be mentioned a little later.

For the first twenty years the operations to which we have referred went on steadily, but slowly, and it was not until the last independent Cornish line was finally absorbed into the Great Western system ten years ago that reorganisation on a more extensive scale became possible. At that time the entire abolition of the broad-gauge was effected, this unavoidable but in some respects regrettable alteration being followed by a scheme for the duplication of the metals on certain sections of the

line, in conjunction with an enlarged building programme. Between the years 1869 and 1886, twelve viaducts were dealt with by the Cornwall Railway Company, whilst the Great Western Railway Company, who owned the West Cornwall line from Truro to Penzance, reconstructed seven viaducts between the years 1883 and 1889. At the present time about two-thirds of the work has been accomplished between Plymouth and Falmouth, and operations in hand between Truro and Penzance provide for the removal of all timber viaducts, except one crossing the beach near the western terminus.

The original viaducts were of two principal types, in the first of which timber piers with pile foundations supported timber trusses carrying the decking and the railway. As a general rule, 40 ft. was the span in this type of viaduct, and height varied from 40 ft. to 100 ft. In the second type, which covers most of the viaducts over valleys affording good foundations, the piers were of masonry, and radiating from their tops braced struts supported the main carrying beams for the line. The piers were usually from 60 ft. to 66 ft. apart, and the cill levels about 35 ft. below the line level. When timbers required replacement in viaducts of the first type, the breaking up of the truss generally became necessary, involving the use of temporary supports, and the expenditure of considerable time during the diminished traffic on Sundays. Repairs to structures of the second type, though more individualised, were not less expensive in the long run. Several of the new viaducts have been built of stone obtained from a quarry near Doublebois, Cornish granite being used for quoins of piers and arches, for impost and string courses, and for coping. The Doublebois quarry furnishes a hard and durable shale rock, excellently suited for bridgework. Segmental arches of varying spans are used, and in the design of Moorswater viaduct the maximum dimensions are reached. Owing to the width of the valley at this point eight arches are required, each having a span of 80 ft., whilst the extreme height of the structure is 148 ft. Building operations here were facilitated by four 3-ton derrick cranes, mounted on stages 70 ft. in height, so that materials could be dealt with at an elevation of 120 ft. above ground level. An overhead road, 2 ft. above the crowns of the main arches, was afterwards used for the distribution of materials for arches, spandrels, and upper works. More recent viaducts are in granite masonry, having the main arches, parapet walls, and, in some cases, the spandrel walls of Staffordshire brick.

We now come to a consideration of reconstructions on the same axes as those of the original viaducts. In two places, Bolitho and Redruth, additional land was not available. At Bolitho the piers did not come opposite the old ones, and they were built up to the level of the impost course; the arches were then built in two longitudinal sections. As soon as the first of these was completed it was used for traffic, whilst the old viaduct was removed and the second section added to the arches. It is a testimony to the skill and care displayed by the engineers that no cracks or inequalities in the line of junction were exhibited. Bolitho viaduct has seven arches of 56 ft. 6 in. span, and a central height of 115 ft. Six other viaducts have been reconstructed, but in a different manner, on the original axes. It will be sufficient if we select one of these, that at St. Pinnock, as an example of the method pursued. Here the line is carried at a height of 150 ft. above the valley, and the original piers being of suitable form, were raised in order that wrought-iron main girders might be substituted for the timber beams and struts. The girders were placed outside the old timber work, then cross and rail girders were added without removing any important part of the timber structure. When the new girder work was sufficiently advanced to afford adequate support for the lines, the timber beams, struts, and decking were taken out one by one, the decking planks being replaced by iron rail decking. In this manner all perishable material was eradicated from the viaduct without the slightest interruption to traffic.

Throughout the whole series of reconstructions, the foundations usually obtainable have been of shale rock, and no cases of settlement due to failures of foundations have arisen from the beginning up to the present time. Timber centering has been used, and as uniformity of span has been preserved as far as practicable, it has been possible to economise by using the same centres for several viaducts in succession. Although shareholders have no particular reason for congratulating themselves that the privilege is accorded them of paying for the excellent exemplification of modern engineering to which we have referred, they must nevertheless feel that a debt of gratitude is due to the capable officials who have been, and still are, engaged in carrying so important a work to a successful issue.

NOTES.

Stonehenge for Sale.

The news, announced in the *Times* of Monday last, that Sir Edmund Antrobus, the owner of the part of Salisbury Plain on which Stonehenge stands, is desirous to sell the famous monument and its site, may be said to be of national importance, as it concerns the preservation of the most valuable and interesting prehistoric monument in Great Britain. If the statement be correct, it is to be hoped that the Government will recognise that it is a duty to the nation to secure the possession of Stonehenge as national property, and thus preserve this strange and mysterious monument from any chance of injury. We feel sure that public opinion would support them in such a course. We may then hope not only to see Stonehenge preserved as "a possession for ever," but to see it guarded from the desecration of being made a place for cheap-trippers to romp about and play at "kiss-in-the-ring"; a performance which was in full swing on the first occasion the writer of this visited it.

Labour Co-Partnership Societies.

An interesting meeting took place last week in connexion with the annual meeting of the Labour Association "for Promoting Co-operative Production based on the Co-partnership of the Workers." It is easier to understand the theory than to realise it in practice. By that we mean that though in theory it is desirable that the workman should be a partner, yet modern conditions of commerce seem to render it impossible that he can be so to any large extent. Rules, it was said, are prepared "for securing that the workers should take a real share of the risks and responsibilities as well as the profits." One of the advantages which the workman who only receives wages obtains is that he is less exposed to trade fluctuations than the capitalist. In good and bad times he gets his wages. No doubt the tendency of things, of late years especially, has been that wages rise and fall with the state of trade, but these fluctuations are not so great as those to which the capitalist is exposed. Yet everything which can be done to make the workman take a larger and more intelligent interest in the responsibility for his work is desirable, and the Association in question aims at this. When the speakers talk of an industrial commonwealth, we are obviously getting into the region of the ideal, and possibly laying up disappointments. On the other hand, to take the workman from being a mere toiler is an object which has the sympathy of all those who are interested in the social prosperity of the country.

The Liability of Railway Companies.

A decision of some interest and importance which should not be overlooked by contractors and builders, has just been given by his Honour Judge Snagge at the Northampton County Court. The plaintiff in the case was a contractor, and claimed from the railway company damages for a delay of four days in the forwarding a truck load of joinery from Northampton to Worcester, when he was engaged on a contract to complete a building within a specified time. When the goods were despatched, the plaintiff had inquired from the company how long it would be for the goods to reach their destination, and he was told two, or, it might be three, days. Accordingly, he sent his men forward, and as there was a delay in the arrival of the goods, their time was lost. Therefore the plaintiff claimed from the company the wages and other expenses to which he had been put by the non-arrival of the goods. Among the conditions in the consignment note was one that the company would not be responsible for liability for "indirect or consequential damage." This condition the Judge held to be fatal to the plaintiff's claim, as there was no knowledge by the company of the consequences of the non-arrival of the goods. It is clear, therefore, that under such circumstances a contractor should, so to speak, make a contract with a railway company to deliver by a particular time, and pointing out at the time the consequences of any failure in the agreement.

St. George's Church, and the Castle, Liverpool.

In the course of demolishing St. George's Church at Liverpool, there has been found beneath a slab at the east end a flight of twelve steps cut in the rock, leading to an arched doorway opening on to another flight of five steps, with a square chamber beyond, whence runs a passage which it is supposed formerly communicated with the riverside. The church, which stands upon the site of the castle, latterly used as a prison, was begun in pursuance of an Act of 1 George I., and finished in 1734, but as the foundations yielded it was rebuilt in 1824-5 by John Foster the younger. Camden ascribes the origin of the castle

in West Derby Hundred to Roger de Poictou, over-lord, *temp.* William I.; but, according to a more trustworthy account, it was founded in the fourth year of King John, who enclosed the park, some 2,000 acres, of Toxteth by purchase of the two manors of Toxteth from the Molyneux family, and part of the manor of Smethom or Esmedune from Robert de Smethom. The wardenship of the castle was vested in Sir Richard Molyneux and his successors in 1420. A remnant of the park, secured by the exertions of R. Vaughan Yates, was laid out by Paxton and Pennethorne, and by John Stewart and A. and G. Williams, of Liverpool, architects. The castle included the area between St. George's-crescent and Preeson's-row. It had towers or bastions, joined by curtain walls; the Castle-street front, with a gate-house and stronger tower, being 36 yards long; whilst the James-street front was 35 yards, the Lord-street front, where were the orchard and gardens, 36 yards, and the front to the pool, landing-place, and quay 37 yards. The ground declined steeply to the river, and vestiges of the ditch—around the circuit of Lord, Cable, Redcross, James, Fenwick, Castle, and Harrington streets—remained to our own time, one portion having been dug up 20 ft. beneath the surface in making foundations for the North and South Wales Bank. The castle, captured by Prince Rupert in 1644, and then retaken by the Parliament forces, was dismantled by order of Charles II. in 1663. Matthew Gregson's "Collection of Fragments of the History and Antiquities of Lancaster" contains a plan (of 30 Eliz.), views, and surveys of the edifice; and Thomas Baines gathered for his "History of Liverpool" (1852), an interesting set of entries relating to sums spent in its erection and maintenance, the earliest being found in the "Pipe Roll of the Sheriff's Account of 4 John," five years before the date of the first charter to Liverpool. In W. Enfield's volume (1774) is a view of the church showing a tower in three stages, after the Doric, Ionic, and Corinthian orders, with a Composite octagonal lantern, and a lofty spire pierced with elliptical openings.

Nos. 7-9, Fleet-street.

We learn that Mr. Edmund Buckle is appointed architect of the premises to be built for the Legal and General Assurance Society, as owners of the site, by Mr. J. Carmichael, of Wandsworth, contractor. The premises now being demolished, and for a long period associated with a well-known law-publishing business, were acquired, we understand, by Mr. J. W. Butterworth's father about seventy-five years ago. Their history, however, can be clearly traced back to the middle of the sixteenth century when, by sign of the Hand and Star, they were occupied by Richard Tottel, "printer by special patents of the books of the Common Law" in the reigns of Edward VI., Mary, and Elizabeth, and the title deeds begin, it is said, from Henry VIII.'s time. Tottel established his presses in the rear portion of the premises (afterwards "Dick's" coffee-house), and there were produced Stow's "Chronicles" and Tusser's work on husbandry. To Tottel succeeded John More, and then John Jaggard, who, it is averred, there printed for Shakespeare the first edition of "Romeo and Juliet." In the reigns of Charles I. and Charles II. the house was tenanted by Joshua and Edward Marshall, masons and sculptors. Two years after Joshua's death, in 1678, the back premises were separately leased to Richard Torvor (or Turver), who established the famous coffee-house, "Richard's," or "Dick's," which survived until two years since, having preserved much of its structurally pristine character. It was thither that Steele conducted the Twaddlers from his lodgings in Shire-lane, and there Cowper, in a fit of derangement, resolved to commit suicide. In 1737 "Dick's" was kept by Mrs. Yarrow and her daughter, whose cause was warmly espoused by its frequenters on the appearance of the Reverend James Miller's comedy, "The Coffee House." Meanwhile, the front part of the premises were occupied, *temp.* George I., by Joel Stephens, dealer in law books, and the exterior, facing Fleet-street, was re-built. The new buildings will occupy the site of "Dick's," overlooking Hare-court, Temple.

Physical Science and Mechanical Arts.

In the August issue of the *Journal* of the Franklin Institute, the announcement is made that the council have decided on the addition of a new section, for the better recognition of the relations between physics and the mechanical arts. Every one will admit that the latter owe much to progress in physical science. Practical engineering and applied sciences generally cannot advance unless pure science is duly consulted, and physical research is only justified so long as it is productive of practical results. Great inventions in the past have frequently been suggested or outlined by investigators who were unable to overcome difficulties in the way of immediate application. That such difficulties have ultimately been surmounted by other brains, is an argument in favour of the new departure on the part of the Franklin Institute. It would be easy to mention numerous examples, showing how inventions which have proved of inestimable value to the world, have been delayed for want of co-operative thought. Amongst practical professional men there is still a lingering tendency to undervalue so-called "theorists," but the same people are apt to forget how much their own practice owes to the labours of investigators such as Newton, Franklin, Carnot, Peclet, Clausius, Rumford, Kelvin, and many more who might be named.

Engine and Boiler Breakdowns.

Valuable information is furnished by the report of Mr. Michael Longridge, M.Inst.C.E., chief engineer to the Engine and Boiler Insurance Company. Space will not permit of detailed comment, but some few summarised figures are sufficiently significant. First, with respect to engines, it appears that 166 breakdowns came under the notice of the Company during last year. Of these 28 were traced to negligence on the part of owners and attendants, and 51 to faulty materials or construction. From a different analysis, we observe that mishaps to cylinders were unusually numerous, generally owing to unsuitability of the parts for the high pressures and speeds now commonly adopted. Bed-plates and other portions of engine framework also show a rather unfavourable record, but in nearly every instance breakages were due to settlement of the seating, in consequence of saturation by oil from bearings. Turning to boilers, it should be said that many of the defects discovered in the course of examinations would undoubtedly have led to explosions. Whilst admitting the fact of great improvement in the construction and condition of steam boilers, Mr. Longridge points out that too frequently safety-valves are found stiff and inoperative, water-gauges defective, blow-off cocks leaky, and joints blowing. Of 59 mishaps last year, 32 were caused by deficiency of water, and the remainder by accumulations of deposit and grease. The causes leading to these conditions may be thus stated:—Constructive defects, 14; inattention, 27; unsuitable water, 7; unascertained, 11. From the abstracts given above, it is easy for the observant mind to appreciate in what manner the perversities of steam engines and boilers, and of their custodians, are most frequently manifested. Further, it becomes evident not only that proper inquiry should take place periodically as to the condition and management of the plant, but also that no steam boilers should be accepted which have not been duly tested and approved by some competent authority.

Electric Traction in London.

The intention of the London County Council to experiment with surface contact systems of electric traction in its system of tramways south of the Thames has given occasion to the advocates of the slotted rail to advance the claims of their methods. The great drawback to this latter method of traction is the necessity of constructing a large drain at a lower level than the conduit containing the high pressure conductor, so as to carry off rapidly any sudden flow of water into it. The construction of these large and deep drains would involve, of course, the disturbance of thousands of pipes of all kinds and would treble the cost of construction. It is these pipes, also, which make the construction of a surface contact system in the London streets such a costly process. Mr. Holroyd Smith, the well-known pioneer of electric traction in this country, has suggested that it would be better to at once construct a subway for the gas, water, and other mains down the streets where the tramways run. The expense would not be very much greater than the underground boxes and channels for the tramway mains, and there would be all the advantages of a subway. A subway being granted, Mr. Holroyd Smith's scheme is to have slotted rails, the slot going through to the subway, and the bare high-pressure conductors being in the subway itself. Where there was a subway this simple method would be almost as cheap as having overhead wires, and so far as safety is concerned would be preferable to them. It is largely a question of the cost of constructing such subways. There is this to be said for it, however, that the ratepayers would get something substantial for the addition to the heavy initial cost of an underground tramway system.

The *Bullfinch* Inquiry.

As we anticipated in this column last month, no precise definition as to the cause of failure has resulted from the inquest concluded on Friday last week. Practically, the decision of the jury is that the connecting-rod broke because it was not strong

enough to withstand the strains involved. This lack of strength is attributed to insufficiency in quantity and variation in quality of the material. So far as the latter criticism is concerned, it is only fair to point out that no unusual or avoidable want of homogeneity has been evidenced; and with regard to the former question, it was clearly shown that the design accorded with modern practice and Admiralty requirements. Our opinion is that not individuals should be blamed, but rather the system which demands the sacrifice of every possible pound in weight for the attainment of lightness and speed. It is to be feared that the factor of safety has also to suffer diminution in the same interests. Whether high-speed reciprocating marine engines will be ultimately superceded by rotary motors, such as the turbine, remains to be seen, but so long as they continue to be used, the breaking strain of their various parts must not be too nearly approached. Quite apart from the above considerations, a new problem arises out of the *Bullfinch* disaster, by the development of vertical fractures in all the high-pressure connecting-rods of the engine. Why these rods, intended for the sustenance of vertical stress, should split in the same direction is at present inexplicable. All the low-pressure rods, however, remained perfectly sound, and this fact is not without significance.

Insanitary Gainsborough.

The Report of Dr. L. W. Darra Mair to the Local Government Board upon the sanitary circumstances and administration of the Urban District of Gainsborough, with special reference to the prevalence of fever, strongly condemns the sanitary state of affairs. The majority of the houses are occupied by persons of the working class, and in the older and more central parts of the town, the report states, there are many courts and alleys, known locally as "yards," in which houses are densely crowded together, and it is very rare to find any through ventilation of houses in these "yards;" where anything of the kind does exist it is generally by provision of a small grating or window in the back wall of a house. Numbers of the houses in these "yards" appear to be so damp or dilapidated from age and neglect as to be unfit for human habitation; many, indeed, are at the present time unoccupied, owing to the emigration of the tenants to houses recently built towards the outskirts of the town. Of more recent erection than the dwellings just described are many houses which, though not arranged in "yards," are nevertheless much crowded together. The "yards" are generally imperfectly paved with flagstones, many of which have sunk in places, or with cobble stones, or partly with both; but in some cases there is no paving except a narrow strip adjacent to the house entrances. These "yards" are drained by means of open gutters or channels leading to a common gully, over which, as a rule, is a tap from which the water supply of all the houses in the "yard" is obtained. It was common to see slop water lying in pools about these "yards," in the crevices of the cobbles, in depressions of the flagstones and open channels, or about the gullies, owing to obstruction in the latter or in the drains connected with them. Little is known as to the construction of the underground drains leading from these "yards" to the sewers. Except as regards the more recently constructed dwellings, excrement and refuse are disposed of mainly by means of middenprivies. Other serious defects in the sanitary arrangements are pointed out, and some very pertinent remarks are made as to the absurdity of paying the Medical Officer of Health 20*l.* a year, and the Sanitary Inspector 50*l.* The Sanitary Inspector, "who has no special qualifications for sanitary work, is nearly sixty years of age, and took up inspector's work after his retirement from business as cabinet-maker." The Report, a lengthy one, is of considerable interest.

WHITE MARBLE FOVNTAIN FROM THE PALAZZO STVFA FLORENCE. 16.CENT:

Rousseau on Roman Remains.

Rousseau's "Confessions," a book more studied by literary men than artists, contains, it is worth noting, one of the most eloquent descriptions in print in regard to the effect on the mind of the great remains of Roman engineering works. Rousseau was on a journey from Geneva to Montpellier, and had been advised not to miss seeing the Pont du Gard on the way. The following is his comment:—

"It was the first work of the Romans which I had seen. I hoped to see a monument worthy of the hands which had raised it; and for the first time in my life, my expectations were surpassed by the reality. It belonged only to the Romans to produce such an effect. The aspect of this simple and noble work struck me all the more that it was in the midst of a desert where the silence and solitude increased its effect; for the so-called "bridge" is in reality only an aqueduct. One asked oneself what power could have transported all these immense stones to such a distance from any quarry, and united the forces of thousands of men in a place devoid of inhabitants. I walked along the three stages of this superb construction. with a respect which made me almost shrink from treading on it. The echo of my footsteps under the immense arches made me think I could hear the strong voices of the men who had built it. I felt lost like an insect in the immensity of the work, I felt, along with the sense of my own littleness

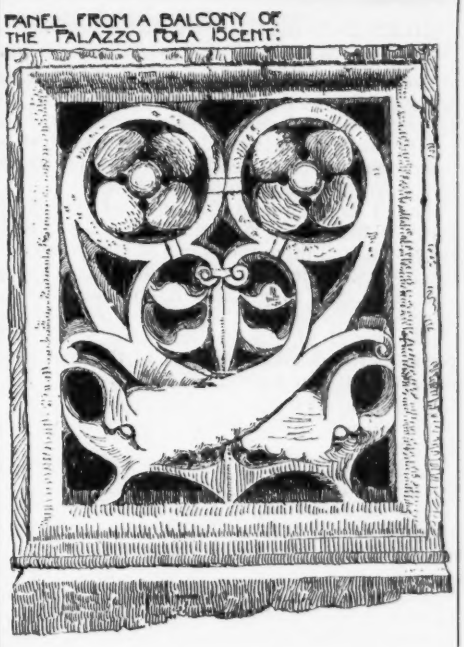
Part of Western Portal, Cathedral of Saint Sauveur. Aix.

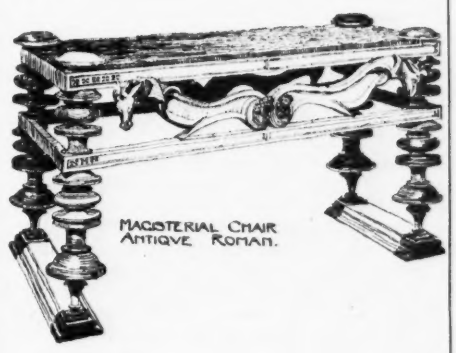
something nevertheless which seemed to elevate my soul; I said to myself, with a sigh—'O that I had been born a Roman!' I remained several hours in this rapture of contemplation. I came away from it in a kind of dream, and this reverie was not favourable to Mme. de Larnage" [the latest of Rousseau's numerous objects of sentimental attachment]. "She had been careful to warn me against the attractions of the young women of Montpellier, but not against the Pont du Gard. One cannot think of everything."

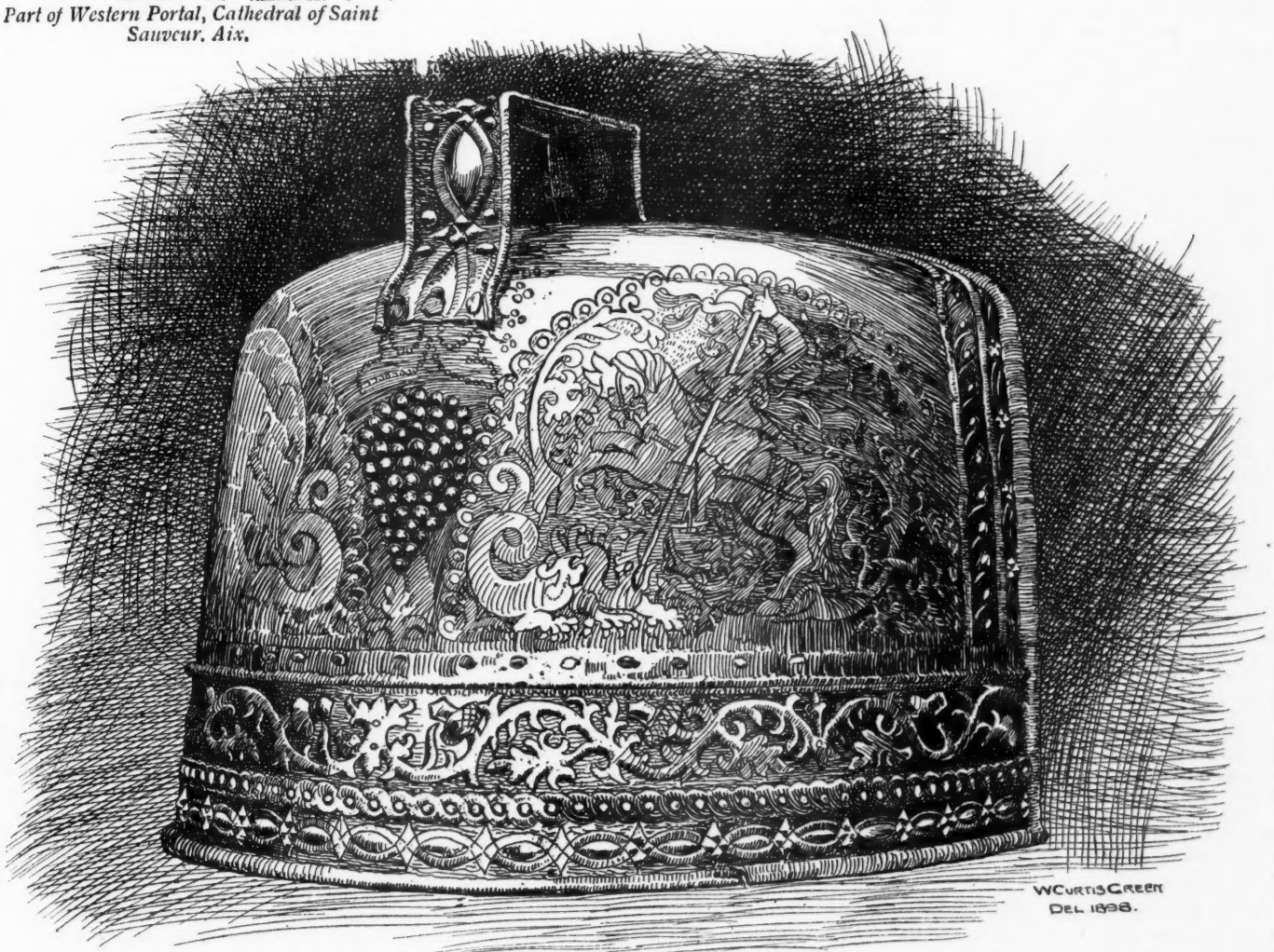
This outburst of enthusiasm is the more noticeable, as in general Rousseau says little in the "Confessions" either of architecture, or of any of the arts except music, to which he was passionately devoted.

SKETCHES FROM SOUTH KENSINGTON MUSEUM.

THESE sketches are from objects in the permanent collection of the Museum. The most notable is the magnificent white marble fountain from the Palazzo Stufa at Florence. The circular basin is supported by bronze brackets, which give a richness to the shadow cast by it. The whole is surmounted by a standing figure of Bacchus in white marble, on a pedestal of dark marble. The drawing of the Mother and Child is made from a cast of the original, which represents part of the western portal of Aix Cathedral. It is a striking example of sculpture used with simple lines for the decoration of a great doorway. The brass fireguard is a good example of repoussé work of the sixteenth century; we think it would have been more effective without the engraving of St. George and the Dragon. The panel from a balcony of the Palazzo Fola is a well-spaced design, only very slightly modelled; it would look well executed in terra-cotta. The bronze Roman chair used in civic functions is worth some study for its mouldings and turned legs.







BRASS FIRE GVARD
WITH TWO FIGVRES OF ST GEORGE AND THE DRAGON. 16TH CENTVRY

MICHELANGELO'S PREDECESSORS.*

Somewhere about the beginning of the fourteenth century folk began to rub their eyes and awake from their long sleep. They began to see for themselves, think for themselves, and act for themselves, instead of leaving the dispensation of their lives in the hands of their feudal superiors and father confessors.

They had been told that they were unfit to arrange their own affairs, and they found that they managed them no worse, at least, than did their lords. They were told that the earth was very vile, and they found it, on the contrary, very beautiful; so full of interest, indeed, that they set sail to discover new continents, and patiently informed themselves of the laws that regulated the universe. The old order had changed, and a new order had taken its place; a change that we know by the name of the Renaissance.

That this rebirth showed itself in Italy first of all, rather than elsewhere, is not remarkable. Those cities which lay between Rome and the Alps were open to the lingering influence of the Greek and Latin Empires, one which still flickered among the basilicas and palaces of Byzantium and Ravenna, while at the same time they absorbed the tide of fresh life that poured constantly down from the North. Then, too, Italy, through Dante, possessed a language and a literature, while other nations were still hesitating as to what dialect should be accepted as the mother tongue. Then, again, she had a climate, which counts for much.

Byzantium was a large and important Greek colony as far back as the great age of Athenian supremacy, and after the sack of Rome by the hordes of the North it was in this Eastern capital that the imperial power of Rome was re-established. Ravenna was a dependency of Byzantium, and the two cities became for a while those places of rest in which civilisation could take breathing space before it was hurried on into a new condition of things.

Thus it was that Italy had at her doors the germs of an art and a literature belonging to ancient time, which might serve as a foundation at least upon which to raise once again a palace of delight, of new material, and imbued with a new feeling. This new sentiment we see at its best in the fourteenth and fifteenth centuries; but we shall notice the old classic basis ever working upward through the structure that covered it until, towards the close of the fifteenth century, this pseudo-classicism becomes indispensable to everything that claims to be beautiful, and has finally monopolised the many meanings that by nature belong to the term "Renaissance," and invested it with this very partial and inadequate sense.

This particular feature, indeed, is but a fringe of a great movement. The discovery of antique works of art and manuscripts of the Greek and Roman philosophers was in itself an accident, and one which, in art at least, served to warp and retard an independent advance rather than promote it. But such an influence was inevitable when once the searchlights of the new spirit were turned upon the world. Thus Italy has given us a Raphael and a Michelangelo, but she has also given us a Gallileo, a Bruno, and a Columbus; and foremost as a foster-mother of great names stands the city of Florence.

Fortune favoured her. Too far removed from the north of Italy to fall under the sway of the despots—those German Emperors and local Princes—that ruled, mercilessly often, as far south as Bologna; and again, situated too far north to become a vassal of the Pope, Florence always enjoyed an independence, if a troubled one. Her people were of the hardy Lombard stock that swept North Italy after the Gothic invasion, which engulfed Rome, had spent itself. The Lombard is not unlike our Saxon, that racial element in us that built up our townships with their guilds and merchant schools.

Safe from the thraldom that menaced her on the north and south, Florence benefited by the rivalry of these opposing powers. When the party supporters of the one became too strong in the city, the other was always ready with aid for their subjection. The imperial influence in the city was represented by the Ghibellines, the popular party by the Guelphs—patrician and plebeians under other names—and whenever the Ghibellines grew active, the Papal power threw itself on the Guelph side. Dante, be it remembered, fought on the side of the Ghibellines, and was exiled upon the fall of his party, an exile that he spent at the court of the Scaligers, the family who represented despotic government at Verona, and where he learned "how hard a thing it was to go up and down other men's stairs."

These factions split society. Ghibellines wore feathers in their caps upon the one side, Guelphs upon the other. The one affected a white, the other a red, rose. It is even said that the Ghibelline cut his fruit at table crosswise, while the Guelph cut his straight down.

The story of Romeo and Juliet is a myth illustrating this opposite condition of things. The Guelph party, on the whole, got decidedly the best of it, and the merchant guilds became important bodies both politically and also as a means of developing those handicrafts that are known as "the Arts." There is not a Florentine painter or sculptor who did not serve his seven years' apprenticeship, and few either who did not begin life by acquiring the goldsmith's trade, by which they learned that deftness of hand and technical method in chasing and casting that afterwards gave them power in dealing with more resisting material.

The division of Italy politically into cities and townships, with the consequent absence of any one metropolis, produced of necessity an effect upon her art. Artists differed in their styles, along with their environment, and so we get, what are a never-ending delight to text-books and professors, various "schools," as they are commonly called. Born with local preferences, and the peculiar technical methods for the display of these, passed on and on from master to pupil, the artist matured in a much more rapid fashion than it is possible to-day.

Among these townships Florence held a front rank. If Pisa produced the first sculptor of distinction in the person of Niccolo Pisano, it was Florence that gradually, either by claim of birth or adoption, enrolled the gifted as her sons.

It is about the Florentine sculptors and architects that we purpose speaking, and those in particular of the fifteenth century, which period, notwithstanding its excesses and conceits, must ever count as the most important of Italian history, and one of the most interesting of the world's history also.

Greek art has ever lacked those sidelights and reflections that some slight knowledge of her artists would throw. Such a loss, perhaps, is not of the importance that it would have been in the case of Italian art, seeing that in the first instance sculpture sought after the expression of an idea, in its most elementary form; while, in the other, the details and profusion that invest the work would often be trivial and meaningless could we not enter into the life and sentiment of the time that its art so naïvely pourtrays.

Florence of the fifteenth century is the city of the Medicis. They preside over it as the local genii, and one must feel that in the presence of Cosimo and Lorenzo one is in touch with the magnetic spirit of the time. The artists were many. Such names as Ghiberti, Donatello, Brunelleschi, Della Quercia, at once present themselves; but these Medici, who, while they ruled with an iron hand in a glove of velvet, lived on terms of such appreciative sympathy with the creative minds around them, that Cosimo, "pater patriæ," and Lorenzo "the magnificent," recall in themselves a host of gifted, if more humble names. It is not often one can so apostrophise the patrons of the arts. These are usually more concerned by whatever glory the association will confer upon themselves than by any true appreciation of or affection for the artist.

But a glamour hangs about these wonderful men—the presidents of a wonderful time—who held their position in the state not by virtue of office so much as by reason of their extraordinary abilities and wide sympathies. The tragical end of Giuliano, the devoted brother of Lorenzo, adds that touch of pity, too, that makes the world kin.

Florence, as regards the position of its chief buildings, was then much as it is now, and so even in Dante's time. The cathedral was begun just before his banishment, about the year 1290, and the church of Santa Croce and the Palazzo Vecchio immediately afterwards.

They mark three distinct points of the city and were built by Arnolfo, a pupil of Niccolo Pisano—the father of Italian sculptors. The cathedral was not then so imposing as we now see it, for the dome was of wood, and placed down upon the nave roof. The existing magnificent dome was built by an architect named Brunelleschi, who was one of the ablest builders who ever lived. It may be imagined what a striking object this great church is, with its many-coloured marble walls, and with the deep red of its tiled dome, in the clear southern sunlight, while beside it, like a sentinel, stands Giotto's campanile. Santa Croce is the Westminster Abbey of Florence. It contains the tombs of her greatest men.

The Palazzo Vecchio, the seat of the Commonwealth, is as graphic a piece of architecture as anything in Florence. It stands erect and defiant, typical of the unbending Florentine character, to which also its skew shaped plan remains in everlasting evidence. In order to have built it square, it must have trenched upon a plot of ground where once a hated Ghibelline palace stood, and, despite the unhappy Arnolfo's plea for symmetry, the people would not hear of their chief civic building being desecrated by such associations. From this tower rang the great bell that called the citizens to arms, and which played its part in all the stirring events of Florentine history. The character of the building is half fortress, half dwelling-house, as are so many of the palaces of Florence, prepared to face scenes of such varying kind.

As you stand upon the hill of San Miniato, where Michelangelo threw up earthworks and held the city against her enemies, the dome and campaniles of these great buildings are very evident, while behind lie the hills around Fiesole, one of the many lovely, but perhaps the most famous, of the suburbs of Florence. A country road winds up to it, bordered by garden walls, which are overhung in the spring by wisteria, lilac, and roses, a profusion backed by the Tyrian purple of the Judas-tree.

Florence cannot be said to have any school of sculpture, to use a current term, that is, any established and permanent resources in the art, before the beginning of the fifteenth century. There were the Pisani, Nicolo, Giovanni, and Andrea, sculptors of Pisa, who, earlier on, broke away from the deposed Byzantine forms and put a new spirit into their figures. But what these did was rather to substitute the robust grouping and detail which they found upon Roman sarcophagi for the languid Byzantine creations. The pulpit in the baptistry of Pisa, by Niccolo, illustrates this change; while throughout the course of Tuscan sculpture one may find these Greek and Roman influences at work, now the one, and now the other predominating, the first in bas-reliefs where delicacy was demanded, and the latter in the larger or freer subjects.

Yet something that we can only call "Florentine" or "Tuscan" was blended with these; a spontaneity, a naïvete, sometimes a simplicity that is near to childishness, displays itself in the style of the early fifteenth century. We cannot fail to notice the loss of this element as simple provincial life became more complex, and clearness of vision became obscured by philosophical speculation. But in Ghiberti, at least, the first in seniority of pure Tuscan sculptors, we shall find this simple trait predominant. He was born in 1378. His father died when he was young, and his mother soon after married a goldsmith. Here is the goldsmith's influence I have spoken of, brought into close relationship with the life of the young Lorenzo, who not unnaturally went to work in his stepfather's shop.

The goldsmith, be it understood, was a much more various person than the tradesman of to-day, whose inventiveness is soon exhausted. He was then a bit of an architect when he fashioned a niche round the stem of a chalice. He was a sculptor when he wrought the saint to fill the niche, and he dealt with colour in the shape of enamels, with which gorgeous material he oftentimes encrusted his work. The care which it was necessary to bestow upon these several branches, and their minutiæ of design, made him technically an artist to his finger ends.

His apprenticeship finished, Ghiberti started on his own account as a painter, and went off to Rimini to carry out some fresco work, but returned again to Florence on hearing that the Signory had invited competitions for the execution of bronze doors to the baptistry.

Filippo Brunelleschi, the architect, and the sculptor, Della Quercia, also entered the lists. They were to design a trial panel representing the sacrifice of Isaac. Between the merits of Brunelleschi's design and that of Ghiberti, the judges appear to have wavered. Brunelleschi,

* A lecture given by Mr. C. J. Tait at the Exeter Technical and University Extension College.

however, settled the difficulty in a manner that was entirely one with his charm of character, by acknowledging the superiority of his rival's claims and withdrawing in his favour. Ghiberti does seem to have taken the greatest possible pains both with his trial plate and subsequently with the execution of the doors. His father was evidently an admirable workman, and gave him much assistance, urging him to make model after model until he was satisfied with the result. "All was finished with so much care," says Vasari, "and to such perfection, that the work seemed not to have been cast and polished with instruments of iron, but looked rather as though it had been blown with the breath."

The southern door had already been made by Andrea Pisano; Ghiberti made the eastern and northern doors, and their execution became the work of a lifetime. Each pair of gates lay in his shop for twenty years before they were complete. The commission was given in 1403, and the two pairs were not in their place until 1450. The north gates are the simpler in design, and are more in accord with the traditional acceptance of the necessary limitations that sculpture labours under in contradistinction to painting. Before he set to work upon the east doors he had the misfortune to make himself master of pictorial perspective. "I sought," he says, "to understand how form strikes the eye, and how the theoretic part of graphic and pictorial art should be managed. Working with the utmost diligence and care, I introduced into some of my compositions as many as a hundred figures, which I modelled upon different planes, so that those nearest the eye might appear larger and those more remote smaller in proportion."

Technically, the skill displayed is marvellous. Figures in relief are a far greater tax upon the artist's resources than when in the round, yet here Ghiberti, as he says, is able to dispose some hundred, in varying elevations, upon his background. These gates were originally gilt, a feature which may have excused Michelangelo's remark, "that they were fit to be the gates of Paradise." Ethically, they violate the canons of good sculpture, and one has only to call to remembrance the Greek frieze, with its broad and simple masses, to appreciate the distinction. Toward such an effect his goldsmith's training was against him, "for goldsmith he truly was," says Cellini, "whose forte lay in the art of casting minute works, and although he sometimes worked on a large scale, it was evident he was then less in his element."

Ghiberti and Brunelleschi were again brought into relationship over the building of the dome to the cathedral, and not this time as rivals, but as partners. Nevertheless, Brunelleschi proved himself on this occasion decidedly the predominant partner. He was, indeed, one of the greatest architects who has lived. The thrust of the dome is enormous, and it required much skill to construct it. It is only when you stand beneath it that you realise the vast floor space that it covers. Ghiberti, while he drew half the pay, was altogether incompetent to assist in such a task, and was, in consequence, doubly officious. The situation proved, at last, too much for Brunelleschi, who took to his bed and said he was sick, a matter, as he explained to the Signory, of no consequence, since his partner was well qualified, surely, to see to the work. But the work stopped, since the masons complained that they lacked instructions. Indeed, Ghiberti found himself altogether unequal to the demands made upon his ingenuity, and ingloriously consented to a sleeping partnership by which he retained his share of the salary. However, this was good enough for the sick man, who forthwith made an immediate recovery and completed the work.

Yet the end was not gained without troubles. There were strikes, even in those days, and "the men having been pressed more than usual by Filippo," as Vasari tells us, "and having received certain reprimands concerning the masonry, discontents began to prevail. Moved by this circumstance, and by their envy, the chiefs among them drew together and got up a faction, declaring that the work was a laborious and perilous one, and that they would not proceed with the vaulting of the cupola, but on condition of receiving large payments, although their wages had already been increased and were much higher than was usual. This circumstance displeased the wardens greatly, as it did Filippo also, but the latter, having reflected on the matter, took his resolution, and one Saturday evening he dismissed them all. On the following Monday, Filippo set ten Lombards to work at the building, and, by remaining constantly present with them, and by saying, 'do this and do that,' he taught them so much in one day that they were able to continue the works many weeks. The masons, seeing themselves thus disgraced as well as deprived of their employment, and knowing that they would find no work equally profitable, sent messengers to Filippo declaring they would willingly return, and recommending themselves to his consideration. Filippo kept them several days in suspense and seemed not inclined to admit them again, but they were afterwards reinstated with lower wages than they had received at first."

Brunelleschi built also the churches of Santo Spirito and San Lorenzo in Florence—two buildings that show what amounts to the invention of a new style, founded upon the pattern of the Roman basilica. He is the Christopher Wren of Italian architecture. He was a man of many friends—Cosimo di Medici, and the greatest of the Florentine sculptors, Donatello, among them.

Frank, naive, impetuous, winning, so beloved, that although Donato was his name, he was always known by the familiar diminutive of Donatello, this young sculptor, as we know him through his works, charms us still. When fifteen years old he went to Rome with his inseparable Brunelleschi, who, just worsted in the competition for the bronze gates, had determined to give up sculpture and stick to architecture. By spending half of the week in assisting goldsmiths they were able to earn enough to keep themselves, while they devoted the rest of their time to making drawings of whatever antique work they might come across. In this manner they spent some five years, and Donatello returned to Florence having acquired at least a very considerable faculty for working in relief.

It must be remembered, when speaking of the antique, that little or no actual Greek sculpture was known at this period. There were doubtless a large number of Greek gems of exquisite workmanship, small personal possessions that had escaped the overwhelming destruction that had fallen upon the larger works of the Greek period, and such relics unquestionably affected Italian sculpture in relief particularly. But the pompous creations that graced the Roman baths obtruded themselves with an irresistible influence. And so it was that the Florentine artist, like the dog and the shadow of fable, dropped his own simple picturesque style that he might possess himself of one that appeared much grander and more impressive. Among Donato's earliest works after his return to Florence was the bas-relief of the Annunciation for the Cavalcante Chapel in Santa Croce. There is a charming grace about the figure of the Virgin, and the pilastered frame is covered with the most delicate detail. Greek influence is very apparent, just as in his St. John the Baptist you notice the coarser realism that the Roman conception might have tempted him toward. He was very expert in depicting children, and the spirit of the infant Dionysos, or Eros maybe, here often displays itself. Nothing is more fascinating than the groups of faun-like infants thronging and peeping from behind the mosaic columns of a music gallery.

We must not forget to mention his St. George that fills one of the niches without Orsammichele, a gift of the Gild of Armourers. St. George stands, a youthful figure, very erect, very open-faced, just a little pert, and secretly proud of himself. St. Mark, too, stands near him, of whom Michelangelo remarked in his simple way, "that no one could help believing the Gospel when preached by such an honest-looking man."

Donatello moved about the country, and did not restrict his efforts to his native city alone. He was in Venice for thirteen years, and he executed at Padua what is by some considered the finest equestrian statue existing. This is Gattamelata, a captain of the Venetian forces.

The difficulty of executing such a figure must have been great. It is said that he had never modelled a horse before, and the examples he could have seen were few. Marcus Aurelius at Rome and the bronze horses that stand over the portals of St. Mark's, at Venice, must have been known to him. But these were unlike the heavy Flemish breed that shows itself in Donatello's conception, and his was clearly a life study. The movement of the horse as regards the action of the legs is said to be unnatural, but this is a difficult matter upon which to give a decision, since photography even has entirely failed to furnish an all-round impression of the movements of an animal in motion. The figure of the Captain is quaint and doll-like, and ill-calculated at least to strike terror. There is an immense amount of work displayed upon the trappings and mountings generally, showing how ingenious and laborious were the attentions these Florentines paid to their work.

There is another equestrian statue that is perhaps better known and more popular than the Gattamelata. I refer to the statue of the Condottiere Bartolommeo Colleoni at Venice by Verrocchio and Leopardi. Personally I find him irresistible. He is a veritable god of war, and the incarnation of the insolence of victory. The individual share which these two artists had in the collaboration of this work has never been precisely determined. Verrocchio's death has always been attributed to a chill which he caught when casting the statue, the heat of the furnaces being added to by the hot anger he felt toward the Venetian Signory, who had treated him ill over the bargain, Leopardi being called in to complete the work. But one sees little in the style of the group that recalls the characteristics of Verrocchio, while it is a significant fact that Leopardi has borne the surname of "del Cavallo" ever since. Donatello was an unequalled master in bronze, and among his last works belong the magnificent doors in the sacristy of San Lorenzo at Florence, together with the pulpits. There is a curious contrast between Greek and Italian bronzes, inasmuch as whereas the former are remarkable for their sharpness, and at once suggest the use of a tool in their modelling, the surfaces of the latter are soft and rounded, bordering almost on a terra-cotta treatment, and imply the dexterous use of the fingers rather than any instrument. So different is the result, that one would be almost inclined to say that both effects could hardly be characteristic of the material. Yet both are undeniably charming. The beautiful pulpits were finished by a pupil, for the master died on March 13, 1466, paralysed and bedridden, and was buried near his patron, Cosimo, in the church where his last works stand. He was regarded in his time as the greatest of Italian sculptors, and none, I think, that came after can wrest the palm from him. He displayed all the delightful Florentine qualities, touched, but not spoiled, by Classic admixture.

As a master of technique and a wizard who could bring out the finest qualities of a material, from the most delicate surface or line in a marble relief to the bossy mass of a bronze casting, he unquestionably holds the way. His great successor, Michelangelo, may have exceeded him in dramatic power, but so often, alas, at the expense of method and treatment of the material in which he shaped his creations. Beyond, too, his excellence as an artist, Donatello was straightforward, workmanlike, and modest. We do not hear of him being fined for the non-completion of his contracts. Nor does he ever boast that he can do everything better than anybody else, a vanity so common among the craftsmen of this period. Yet he did them better nevertheless.

I need not remind you of the fact that these sculptors were their own bronze casters, one that is painfully recalled by the untimely death of the gifted Verrocchio. Yet it is only fair to the artists that we should remember it, since the undertaking of so anxious and laborious a work should greatly enhance our estimate of their successes. The operation is briefly as follows:—A mould of baked clay has to be carefully made from the model, and this mould must be so constructed that it will take to pieces. The interior is oiled and covered in wax to the thickness required for the metal. The remaining space within the mould is then filled with a concrete of plaster and brick surrounding an iron framework—necessary to give the casting support. The mould is now taken to pieces to see that the core is perfect, and, being again put together, the wax is got rid of by heat, and into the space it occupied the molten metal is poured. Provision must be left for the removal of the core—apertures that are afterwards filled in—and also for the gases to escape. If the work were large, the limbs would be cast separately, and the core thus easily removed. If quite small, the model would have been made in wax, and so be entirely melted out, leaving no core at all—a

method known as the "cire perdue," and one much employed by the Italians. The drawback to such a process is, however, that you k'ck away your ladder before you are quite certain of your footing, since the casting may prove defective. And further since it is the fashion to-day to regard an original sketch as something more than a means to an end, the "cire perdue" is little resorted to. If you would fully appreciate the risks and excitement attending these labours, you should read Cellini's graphic account of the perils by storm and by fire which he encountered in the casting of his Perseus, and of his final salvation by his sacrifice to the melting-pot of all his pewter dishes, some 200 in number, as he plaintively tells you.

Donatello left behind him one pupil of as gentle a nature as he possessed himself, "the first-rate Desiderio, so kindly and so handsome," so a contemporary describes him. He did not do any great amount of work, but, "sculptors like Desiderio or poets like Gray tell us in a few perfect marbles and poems all that they would have said had their works been infinitely multiplied." There is a tomb by him in Santa Croce to a scholar that entirely corresponds with such an estimate. An old man with a beautiful face lies as though asleep, with his hands folded upon the book he loved, very likely his Plato, surrounded by exquisite detail in the Florentine style, and full of charm and fancy. No monument could be fitter. There is nothing in it ostentatious or inappropriate. What a contrast such a memorial presents to the kind of thing considered suitable in the last century or even in this!

Desiderio had an intimate friend, one Mino da Fiesde, whose style also possessed an infinite grace, and at the same time a great deal of character. There is a portrait of his bishop in the cathedral of his native town, Bishop Salutati, full of life and piquancy, perhaps the most convincing portrait I know.

You will remember that one of the unsuccessful competitors for the Baptistry gates was Della Quercia. He was born in 1374, and was the son of a goldsmith. He was born near Siena, and one of his chief works was the celebrated fountain in that city. He left to carry out his equally famous work at Bologna, before the fountain was completed, and was followed by a messenger warning him that unless he returned he would be fined 100 lira. Presumably, he proved disobedient, since he writes later begging that his fine may be mitigated. Let us hope his petition was granted, for his magnificent work upon the portal of San Petronio, at Bologna might well excuse him anything. His decorations to the great doorway consisted of ten panels in relief from the Old Testament, and ten from the New, and they show unquestionably, I think, the truest feeling for the antique that Italian sculpture ever reached. He is often said to have been, and without, I think, any sufficient reason, the direct inspirer of Michelangelo. The latter lived for some time at Bologna, and must greatly have admired this sculptor's work there; but it was the pose only of Michel's creations, and not the feeling, that unites him to the classical school, and the former was purely an accident due to the tastes of his time. A closer analogy between the two artists may be found in the incidents of their lives, since both lived in perpetual conflict with clients. Della Quercia fell out with the Signory of Bologna, as well as with that of Siena, and his effects were sequestrated to pay "for loss of time and annoyance," a mediæval rendering, one might say, of "moral and intellectual damage."

There is a name which has spread itself widecast, partly due to the number of works associated with it, and partly to their picturesqueness—the name of Della Robbia. Della Robbia ware forms a staple of most museums; South Kensington has some fifty examples, while there are few churches of importance in Italy that do not count some piece among their decorative effects. Luca invented it, and besides possessing the business faculties which enabled him to manage and develop a most extensive enterprise he was also an exceedingly clever artist. He also enjoyed a very long life, since he was born in 1400 and died in 1482, a circumstance which contributes to the vast number of his works. Then he had a nephew, Andrea, whom he took into the business and who lived till 1525. Their art consisted in modelling, glazing, and firing terra-cotta groups, reliefs, and ornaments of all kinds. The only actual invention seems to have been the perfection of the glaze, and the freer introduction of colour. Otherwise, they can only be said to have turned out on a very large scale what had been done in a smaller way already.

Various receipts have been named for this glaze, but, as in all such cases, the one thing to know is what to do with it. Further, the process of firing is a very delicate matter. The clay may twist, or may fly, or the glaze may be imperfect. The size of some of the figures in this ware makes one wonder at the perfection which was reached. Those of St. Dominic and St. Francis in Santa Croce could not have been posed or wrought with more feeling had they been in marble. The drapery, the hands, the features, are simple and dignified. Yet the style in no sense actually borrows from statuary, but is quite one with the plastic nature of the material. These particular figures are in white glaze, and I think the ware is safest so. But colour, of course, was for decorative purposes a great addition to have been enabled to make, and to the pictorially-minded Italian the coloured specimens were doubtless in the greater demand. But these may be objected to, firstly, since the artist was limited by his process in colour selection, and his washed-out looking backgrounds can never be anything else than unsatisfactory. Picture to yourselves the colour obtainable upon enamelled metals, and you cannot place enamelled clay other than a very long way behind. Then, secondly, these realistically coloured statues appealed to the naturalistic sense, and depreciated consequently the claims of a work in a material where the artistic expression had a greater predominance.

Still, Della Robbia ware is very charming, and in some instances, impressive. The children, the bambinos, the little chubby angels with little fluffy wings about their heads and breasts peep out from numberless and unexpected corners. All around the cornice of the Foundling Hospital in Florence are these significant little baby heads. Durable as this faïence is, and in so far adaptable to external uses in architecture, one cannot say that its application is altogether a happy one. The very fact that it entirely resists the effects of the atmosphere, while its surroundings have become toned and softened by age, produces an effect that is inharmonious. Also inserted in spaces which were never designed for them, they appear insufficient and overwhelmed.

It is indeed this class of art which signified the coming on of old age in Italian sculpture. But it was a cheerful and prattling old age, and very different to the last stage of all, sans grace, sans beauty, sans style, sans everything. The fifteenth century had, indeed, been a brilliant one, but it was burning itself out. Under Lorenzo the Magnificent sculpture, painting, poetry, philosophy had held such sumptuous court as the world had not seen the like of before.

Prosperity had been great, too great for the pleasure-loving Florentine nature. Masks and revels had become pandemoniums. A reaction was inevitable, and it came with Lorenzo's death, which occurred in the spring of 1492. That the reaction should have been extreme and severely religious was only natural, and its instrument and mouthpiece was Savonarola, "scourge and seer." The nerves of Florence were shaken by the pace at which she had been living, and the sermons of this preacher in the Duomo "caused such terror, alarm, sobbing, and tears," says a witness, "that every one passed through the streets without speaking, more dead than alive." Then the extraordinary historical event happened, the royal progress, if it may be called so, of the French King Charles VIII. through the length of Italy. He came at the head of a large army, but there was no fighting. Its presence overawed the cities he entered, and their citizens were glad to be rid of him with a present of money. That he should thus have ridden into Florence was too much for Florentine pride, and Piero de Medici, who had succeeded his father Lorenzo, and who had permitted this act and made base terms with the French king, was summarily expelled.

Now was Savonarola's opportunity. He proclaimed a republic and placed himself at the head of it. "During this time," it is said, "such an inspiration of love and sacrifice breathed throughout Florence that unlawful possessions were restored wholesale, mortal enemies embraced each other, hymns, not ballads, were sung in the streets, and over the Palazzo Vecchio was written 'Jesus Christ is the King of Florence.'" A large bonfire was lighted in the piazza, and all books and pictures that were judged unseemly were committed to the flames. Bartolomeo and Botticelli, among others, caught the fever, and fed the pyre with their masterpieces.

Such feeling was obviously overstrained, and illustrated a phase of the general dissolution, the completeness of which Michelangelo was destined to see. The tide turned, as tides will, and Savonarola was executed. Florence did not want a Pope, if a reformed one. The effort was noble and disinterested: an endeavour to reconcile the new spirit with the old faith; but Florence could endure, seemingly, neither the ills nor the cure. The days of her greatness were gone, not to return. She reached the zenith of her power under the Medici Prince Lorenzo. Her light failed under his corrupt successor, Piero, and Rome stepped in to fill the void. Thenceforth all the great Italian architects were Roman, and her sculptors, at any rate, cosmopolitans.

To Michelangelo her good name was still dear, although his work for the Popes kept him in the great capital rather than in his native city, and he risked his liberty in her defence. If we would watch her final efforts on behalf of these arts, it is from his life that we must seek them. We shall find there a splendid reawakening, although any restitution of the great traditions of her arts, had become, even in his time, impossible.

What these traditions were we may learn from Donatello, Desiderio, and the little group of Tuscan artists I have given, and to which you may add, as your preference bids you, other less well-known names. Touched with a playful ostentatiousness that renders it all the more human, their work has a simple charm that belongs to the childhood of our age, and which, like youth, can never be revived.

Books.

Stories of the Streets of London. By H. Barton Baker; with illustrations by Charles G. Harper. London: Chapman & Hall.

Attracted, it may be, by the title-page of this volume, the serious student of London's history will be somewhat disappointed when he finds that it presents a series of the many phases of London life, and of the people in their habits and their homes, as they lived, yet deals but sparingly with the actual story of the streets themselves, their origin, and the manifold changes which they have undergone. The latter aspect of the subject, however, does not appear to come within the author's scheme. Mr. Barton Baker devotes 430 pages to some interesting reminiscences—many of them fairly familiar—of a large variety of personages, frequently interspersed with trite reflections and moralisings that serve no useful purpose. The best parts of the book are, perhaps, the chapters that deal with the old "rookeries," coffee-houses, and gambling-houses, nor are the earlier taverns neglected, though we would willingly forgo much that has been rehearsed over and over again. Mr. Baker's quotations, and his French and Latin, also, are less accurate than we should expect in view of the credentials he brings to his task. Such phrases as "in virgin meditation fancy free"; "others who are now *nomines preterœa* [sic] *nihil*;" "'Tis true, and pity 'tis, 'tis true;" "*puerisque virginibus*;" with others, need correction.

Turning to matters that lie more within our own province, we notice that the author speaks of the recently destroyed Rolls Chapel as having been built by Inigo Jones; he cites, too, "the removal of the principal offices [of the Metropolitan Police] to the abandoned opera house on the Embankment." It is true that Mr. R. Norman Shaw's police offices occupy the site of the abortive Grand National Opera House, but from that point all likeness ends between them. The chambers occupied by Thurloe in Lincoln's Inn (which might be aptly described as the Foreign Office of the Commonwealth) are on the ground floor of No. 25, Old Buildings, and the commemorative tablet (due to the care of the late Mr. A. Cowper Ranyard, a member of the Inn) is affixed on the front in Chancery-lane—not, as Mr. Baker says, on "that ancient tower in the south-west

corner," which is No. 21. Moreover, the sale-room at No. 47, Leicester-square is not Sir Joshua's studio, for it was erected (on the site of his stables) many years after his death, for the Western Literary and Scientific Institution; and our author has fallen into the not infrequent error of saying that No. 11, Berkeley-square was Horace Walpole's. In our "Note" of November 21, 1891, we showed how the "No. 11" of Walpole's day was re-numbered "42," and how "No. 40" became "No. 11." In No. 454, of the *Spectator*, Steele mentions his landing "with ten sail of Apricock boats at Strand Bridge," meaning the river bridge, or stairs, which the author seems to confuse with the bridge in the Strand, near the opening of (old) Duchy-lane. It is incorrect to say that Messrs. Butterworth's premises have "just been demolished" (for they were standing when the book was published), to speak of the old almshouses on the west side of Charing Cross-road as still standing, to identify Newcastle House, Lincoln's Inn-fields, with that wherein John Forster had chambers, or the Soho Bazaar with the residence of Sir Joseph Banks in Soho-square.

Egyptian Ceramic Art. The MacGregor Collection, a contribution towards the history of Egyptian Pottery. By HENRY WALLIS. With Illustrations by the Author. (Privately printed.)

MR. MACGREGOR'S collection of Egyptian pottery at Tamworth is one of the most remarkable hitherto made, and in this handsome volume—the first ever devoted to Egyptian ceramics—it is worthily illustrated on pure linen paper that will endure when most of the great catalogues now being printed will have powdered away. Mr. Wallis's drawings of the finest specimens at Tamworth fill thirty coloured plates, and these are supplemented by careful renderings in black and white of nearly two hundred analogous objects either belonging to Mr. MacGregor or selected from other collections, public and private. The author, whose work on the splendid Persian glazed and lustre wares is well known, has made a long study of this allied subject, collecting originals and also filling his portfolios with sketches from the museums of Europe and Egypt. Mr. Wallis prefaces his new work with the statement that it is not a history of, but a contribution to the study of Egyptian ceramics. To follow the development of the potter's art through the many thousand years of its employment in the Nile Valley will be an interesting task when Professor Petrie has collected the material. But museums and private collections contain many striking specimens of its higher developments, especially in glazed ware, and the author has done well in here bringing so many of these together.

It is remarkable that the Egyptians never, or practically never, applied glaze to clay; on the other hand, white stones and white sandy body for pot-making were glazed blue and green from the earliest times, and showed up the colours brilliantly. From the age of early bronze the Egyptians had apparently a predilection for glazing quartz when fashioned into heads and figures; afterwards, throughout all their history, they freely thus lavished colour and brilliancy upon objects carved out of less obdurate stone, such as schist, which had still the merit of being less fragile than pottery, and when burnt took the appropriate white surface beneath the glaze. No minor Egyptian antiquities are more familiar than the glazed steatite scarabs, from which, alas! the colour has usually perished. On page viii., in colours, and in figs. 15-31 Mr. Wallis gives examples of figures, toilet jars, &c., dating from the Middle and New Kingdoms onwards, elaborately carved out of schist and glazed. The art of glazing, probably coeval with that of metal working in Egypt (about 4000 B.C.), was still flourishing in Roman times, and, as the author observes, the Egyptian potter continued to produce very remarkable work under Arabic rule. Mr. Wallis assigns to Egypt the supremacy in ceramics amongst all the nations of antiquity, not only for colour and technique, but also for the application of decorative designs to their wares. He readily allows that in vase painting the Greeks were unequalled for "sublimity of design" and "matchless grace and power of drawing," but this, he contends, is an adaptation of pictorial art rather than a development of ceramic ornament. The earliest examples of Egyptian which he quotes are of the XIth and XIIth Dynasties (more than 2000 B.C.), but glazed figures and beads of far earlier date exist in considerable numbers. Eighteenth Dynasty work is pre-eminent for beauty and variety of glazes, and judging from the remains found by Mr. Petrie in the ruins of the palace at Tell el Amarna—not, however, represented in this catalogue—the decorating of wall surfaces with inlays of glaze had then already been practised with great artistic success. Under the Ramessides such embellishment was still further elaborated; some years ago the fellahîn of Tell el Jahudieh laid bare, broke up, and sold piecemeal the walls of a chamber in the palace of Rameses III. (about 1250 B.C.), which must have been entirely decorated with inlays of tile work and alabaster. The tiles formed bands of rosettes and other ornamental designs set in varied backgrounds, as well as inscriptions and scenes of extraordinary gorgeousness of colour and richness of detail. Unfortunately little or nothing can now be ascertained as to their arrangement.

The volume is, of course, mainly dedicated to glazed ware; but some other kinds of decorated pottery are also represented in it—*e.g.*, on plate xv. and in figs. 61-83. In figs. 61-4 we have examples of unglazed pottery painted with primitive figures of men, animals, boats, &c. These are now classed as early dynastic, if not pre-historic; Mr. Wallis calls them simply of the "Old Kingdom," though for Egyptologists that term generally denotes the IVth to VIth Dynasties. In certain hand-made red and red and black pottery a bright polished surface was produced at a very remote date by burnishing. That this type persisted from prehistoric or early dynastic times until Roman, as Mr. Wallis suggests, cannot be admitted (though polished pottery of one kind or another may be found of any period). He incidentally quotes Professor Petrie in this connexion; but further excavations have convinced the latter that he was misled in ascribing the specimens from Ballas to so late a period as *post* VIth Dynasty. The Professor's latest chronological conclusions with regard to all the earliest styles of Egyptian pottery are now set forth at University College, London, and may be studied by any visitor there. It is only by careful excavation and recording of results that any definite knowledge on this subject can be gained, and it is now well known that this polished ware belongs to the earliest periods almost exclusively.

Mr. Wallis points out that though the detail in ornamentation of pottery as given on the monuments is not to be trusted, standard vase forms are faithfully represented, and he asks for a handy publication of them. Of course, this should be done with discernment. In the ordinary pictures of offerings the vase forms are largely conventional, and copied without change from ancient figures; it was only occasionally that the Egyptian artist permitted himself to draw fresh inspiration from the living world around him.

Not only is the present volume beautiful and artistic; the text is pleasantly written and full of instruction even to the specialist, who, while thanking Mr. Wallis for new and true views, will supplement or correct his statements out of his own knowledge.

The Story of Rouen. By THEODORE ANDREA COOK. London: J. M. Dent & Co. 1899.

THIS pretty and interesting little book is one of Messrs. Dent & Co.'s Mediæval Towns Series. Its four hundred pages are full of historical and antiquarian information, not in all cases very intimately connected with the story of Rouen, but always welcome, and the story is told with a quiet, rather poetical feeling, that sometimes induces forgetfulness, and generally forgiveness, of the writer's many elementary faults. It suffers in more ways than one from its small size; the type, though open and clear, is too small to read with comfort, and most of the illustrations are spoiled by reduction to so small a scale. Rouen is a town of exceptional interest, not only to the historian as the chief seat of the race that first conquered Normandy and then England, but also to the architect in consequence of its numerous Mediæval and later buildings. Many English architects of middle age and more entertain a sentimental affection for it as one of the earliest places visited in those student days when a well-filled sketch-book was their chief ambition. It is, therefore, very much to be regretted that the writer has not put his matter in a form more easy to read, but the truth is that it is so discursive and so full of irrelevances, badly-constructed sentences, and even bad grammar, that the thread of the story is very hard to follow, and even the meaning of single sentences is sometimes obscure. We find it difficult to understand how any one with the large fund of information, much of it of a very uncommon kind, and the cultivated feeling that Mr. Cook shows himself to possess, could pass the following (p. 95):—

> "Later on it" (a certain building) "got the name of 'Chartreux,' which still remains, because the besieging army of Henri Quatre wrecked the abbey on St. Catherine's hill, above the town, and the monks came to Quévilly, where the Carthusians had already settled themselves when the English turned them out of the Chartreuse de la Rose, which was the headquarters of our Henry V. during his siege of Rouen early in the fifteenth century."

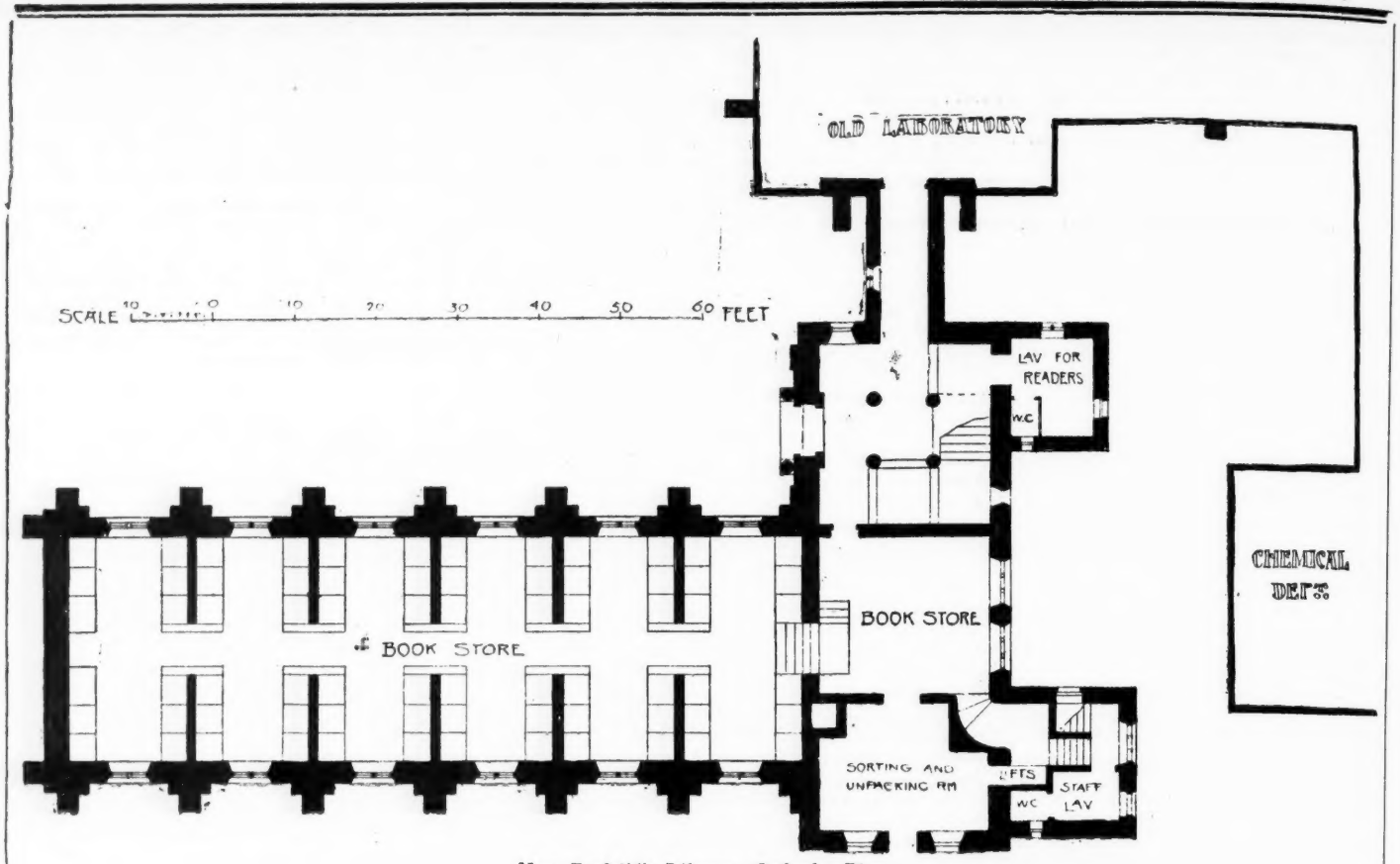
This is not an unfair specimen. Unfortunately, we could quote many similar passages, to say nothing of slips in grammar. Yet the book is a good one; that is, the matter is good—worthy of a far better literary setting.

Bacteria: Especially as they are Related to the Economy of Nature, to Industrial Processes, and to the Public Health. By GEORGE NEWMAN, M.D., F.R.S., D.P.H., Demonstrator of Bacteriology in King's College, London. London: John Murray. 1899.

THIS, the latest volume of the Progressive Science Series, does not claim to be either a record of original work or a text-book for the laboratory, but is an attempt "to set forth a popular scientific statement of our present knowledge of bacteria." That the attempt is highly successful we have not the slightest hesitation in declaring, and it is no derogation from the merit of the work to say that the records of a science which, like bacteriology, is progressing by leaps and bounds, cannot possibly be brought up to date by a single writer. Dr. Newman, however, must be congratulated on having performed his difficult task so well. The researches of Dr. Klein and Dr. Andrewes as to the part played by the *Bacillus enteriditis sporogenes* in the causation of infantile diarrhœa are mentioned, although they were not published until the end of last year; and the same may be said of Dr. Martin's experiments on the growth of the typhoid bacillus in soil.

In the first chapter Dr. Newman explains the vegetable nature of the minute organisms known by the generic name of bacteria, and "for practical convenience rather than academic accuracy" accepts the usual division of the lower bacteria into (1) the round cell form—*coccus*; (2) the rod form—*bacillus*; and (3) the thread form—*spirillum*. The composition, movements, modes of reproduction, and other characteristics of bacteria are in turn considered, the laboratory methods of inoculation, cultivation, and sterilisation are described and illustrated, and other information is given, so that the reader may be prepared for the chapters on bacteria in water, in the air, in the soil, in milk, &c. Tuberculosis is more fully discussed than any other disease, and the author has summarised in a series of eighteen statements the chief facts concerning its cause, spread, and treatment—facts which, as he rightly says, "every individual in our crowded communities should know." With reference to the spread of typhoid fever, Dr. Newman is inclined to believe that it is due to Eberth's *bacillus typhosus*, although this is not yet definitely proved to his satisfaction. He does not think that the bacillus of diphtheria is ever found in sewer air, but considers that such air affects the tissues of the throat in such a manner as to render them more susceptible to the action of the bacillus when this is inspired from the ordinary atmosphere.

To the general reader the chapters on "Immunity and Antitoxins" and "Bacteria and Disease" will probably be of most interest, as they contain an admirable summary of the known facts about these important matters—a summary which ought to be among the mental equipments of every educated man. To the architect and sanitarian the book cannot fail to be of service, as it contains a mass of information of prime importance concerning water-supply, ventilation, soils, and disinfection. Dr. Newman writes clearly and directly and—except in a very few instances—without undue technicality, and his illustrations are well selected. One or two criticisms must be made, although they are not very serious. For instance, it is scarcely correct to say that the doctrine of spontaneous generation was "propounded" by Needham, seeing that it was held



New Radcliffe Library, Oxford. Plan.

by Harvey a century earlier, and can be traced back to Aristotle. Then again, the resistance of spores to heat is not stated in a sufficiently guarded manner; on page 32 we are told that "boiling at 100 C. (212 Fahr.) . . . for thirty to sixty minutes will kill all bacilli and all spores," on another page we are told that "moist heat at 100 C. (212 Fahr.) for fifteen minutes will kill bacilli and their spores," and on page 81 the following sentence occurs, "as we have seen, moist heat at the boiling point maintained for five minutes will kill all bacteria and their spores." To say the least, these statements are conflicting, but they may be even dangerous, for Dr. Klein, writing at the end of 1898, declared that some spores "escape destruction when subjected for a considerable time (even over two hours) to boiling." Conflicting statements as to the prevalence of bacteria in burial soil occur on pages 140 and 153, but this is a detail.

Notwithstanding these minor blemishes, there is no better book on this subject for the general reader.

"Amateur Gardening for Town and Country." Vol. XV. London. 1899.

The year's volume of *Amateur Gardening* is full of most valuable information for those who have gardens of any size, even down to the garden contained in a window-box; but why should this receptacle for flowers (for it should be nothing else) be vulgarised, as suggested on page 41, by the addition of cork nailed on? Surely nothing can be more offensive and more ruinous to the architecture of any house than cork window-boxes. Window-boxes should be as unnoticeable as possible; they are there only to hold the flowers, and should be painted the colour of the woodwork, or a dull green to mingle with the foliage. There is a good article on the "laying out of small gardens," with a plan, showing a formal garden near the house, and through an archway a path leading to the herbaceous garden, which is the real delight of the true gardener. We fail to see why the paths in the informal garden need be quite so crooked; a wild garden can grow as well by the side of a straight path as it can by the side of a path which wanders aimlessly round a shapeless piece of grass. There is a charming illustration of some cottage gardens in Cumberland, in which the creepers on the walls are trained up in a conventional pattern on strings, and not nailed out on the walls. There is an interesting article on "Plant Collecting in Foreign Lands," by F. W. Burbridge. It seems that the desire to collect and classify plants is no mere freak of the present day. On the walls of a room in the great temple of Karnac are a series of exquisite carvings of all the foreign plants collected and brought home by Thothmes III. on his triumphant return from a campaign in Arabia. "These sculptured records show not only the natural aspect of plant or tree, but leaves and flowers; fruits or seed-pods are shown separately, as in our modern botanical works of to-day." An inscription was put up by the collector by the side of his botanical collection which is worth quoting:—"Thus saith the King, I swear by the Sun, and I call to witness my Father Ammon, that all is plain truth; there is no trace of deception in that which I have done. What the splendid soil brings forth, in the way of productions, I have portrayed in these pictures, with the intention of offering them to my Father Ammon as a memorial for all time." Professor Petrie has taken casts and photographs of these wonderful old records; some are in the museum at Cairo, some in the British Museum.

The volume contains some really beautiful coloured illustrations of flowers.

The Arithmetic of Electrical Measurements. By W. R. P. Hobbs, R.N., A.I.E.E. London: Thomas Murby.

This will prove a useful book for all who wish to obtain a working knowledge of the arithmetic of practical electrical measurements. The examples are well chosen, and as the answers are always given, the young student can test the progress he is making. It would have been better, however, if the author had always used the same electrical phrase to signify the same thing. For example, the beginner might well think that "for quantity," "abreast," "in multiple arc," "in parallel arc," and "in parallel," must mean slightly different arrangements of the cells. Nowadays, "in parallel" is the phrase nearly always used for the electrical arrangement designated, and it is quite unnecessary to keep up the antiquated phraseology. We can also recommend this book to teachers of elementary electricity, as they will find in it many useful examples suitable for class teaching.

The Workmen's Compensation Act, 1897. With Notes. By W. A. Willis, Barrister. Sixth edition. London: Butterworth & Co. 1899.

The demand for short and clear works on the Workmen's Compensation Act is well shown by the fact, as appears above, that Mr. Willis's work has gone through several editions in a very short time. In truth there is no more to be said of this book. The proof of the pudding is in the eating, and it is clear that this book has—as it deserves—met with a successful sale.

The Valuation of Land and Houses. By Charles E. Curtis, F.S.I. London: F. P. Wilson, *Estates Gazette* office.

This is a useful little work. There is not much more to be said of it, because, after all, a competent surveyor who knows his business can state in writing the general principles of the valuation of property. There is one practical point upon which we may make a suggestion. It is said that a professional man about to value an estate will inspect the geological maps sold by the Ordnance Department. It is much safer to write to the office of the Geological Survey, since fresh researches are being made every year and noted in that office.

Illustrations.

RADCLIFFE LIBRARY, OXFORD.

The library founded by Dr. Radcliffe was originally housed in the famous dome built by Gibbs between the Bodleian Library and St. Mary's Church.

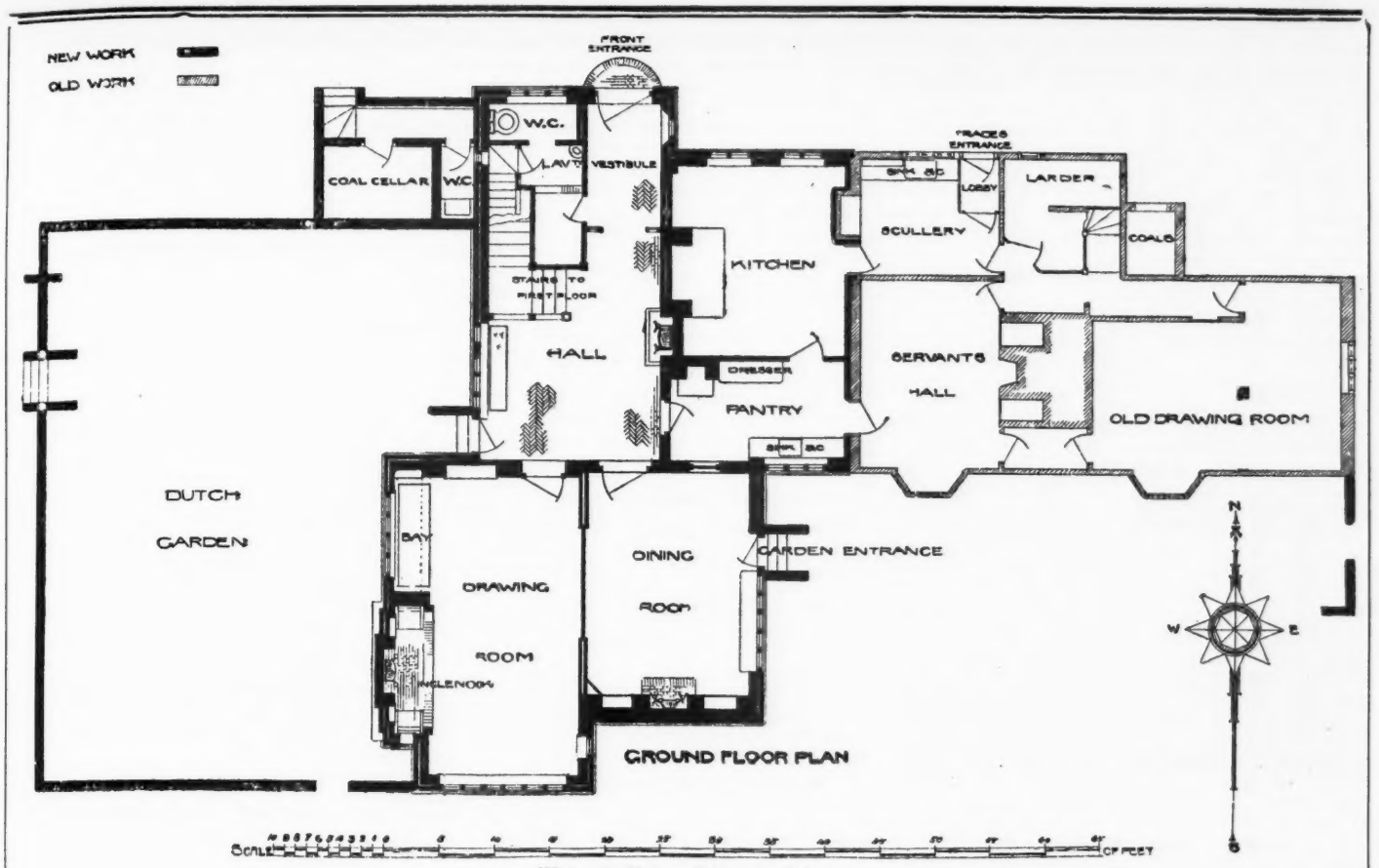
When the new museum in the Parks was founded as the home of science in the University, the Scientific Library was transferred to the new building and Dr. Radcliffe's dome, under the title "Camera Bodleiana," became a reading-room in connexion with the Bodleian Library.

The Radcliffe Library having outgrown its present quarters, the Worshipful Company of Drapers, of which the Rev. Dr. Boyd, Principal of Hertford College, is a member and Past Master, generously undertook to build a new library at a cost of over 20,000*l.*, and to present it to the University.

The new building, which is now nearly ready for the roof, was designed by Mr. T. G. Jackson, R.A.

It consists of a spacious book store below, with a half floor of iron gratings, dividing it into two heights, capable by means of fixed and rolling cases of containing over 100,000 volumes.

The first and second floors contain, besides rooms for librarian and staff, and some smaller reading rooms, two large reading rooms, 90 ft. by 28 ft. each. These rooms are divided by projecting bookcases into twelve pens, or pews as Sir Christopher Wren calls them, in the fashion of college libraries. There is room in the whole building for 150,000 volumes, which will allow for the growth of the library at its present rate for many years. The general



Waxwell Farm, Pinner. Plan.

contractors are Messrs. Parnell & Son, of Rugby; the heating is by Messrs. Haden & Son, and the fireproof construction by Messrs. Homan & Rodgers. The clerk of works is Mr. E. Long.

ILLUSTRATIONS OF VERSAILLES.

THESE illustrations are given in connexion with the first article in the present issue. They show the general views of the palace towards the courtyard and the garden, the interior and exterior of the chapel, and the Petit Trianon and its formal garden.

The illustrations of the chapel are from photographs by M. Joseph Lévy, of Paris.

HOUSE, SAUNTON SANDS, NORTH DEVON.

THE house stands high, over-looking Barnstaple Bay, on the lower slope of Saunton Down. It is sheltered to the north but exposed to the south-west, and is built with hollow walls of hard local brick, pebble rough cast, on a basement of local stone obtained from the hillside. It is roofed with local red tile.

The staircase, verandah balustrades, doors, grates, and mantel-pieces came from the houses in Whitehall recently demolished to make way for the new Government Offices. The total cost was about 1,300*l.* The builder is Mr. H. Slee, of Saunton.

G. H. KITCHIN.

WAXWELL FARM, PINNER.

THIS is one of those old farmhouses of between two and three hundred years old with which the district abounds. Charming in their picturesqueness, they are quite unlivable as well as badly arranged. In this case the owner, Mr. Edward Trotter, has added hall, staircase, dining and drawing rooms, and bedrooms over, making a comfortable country house. Nothing but old material was used outside, and the feeling of the ancient work was kept. The old oak, seasoned for more than two hundred years, when cut out of beams for the mullions and frames of the windows, twisted and opened as though it had been just felled, and actually distorted the strongest make of iron casements.

Inside, the sitting rooms are panelled in smoked English oak to within 2 ft. of ceilings, where the constructional timbers are shown. The half-timbered partitions, as well as roofs, are similarly treated. Messrs. Green & Abbot were the builders, and Mr. W. Howard Seth-Smith was the architect.

THE LINCOLN HEALTH EXHIBITION.

IN connexion with this exhibition, the Council of the Sanitary Inspectors' Association decided to award silver and bronze medals for the best two exhibits of manufacturers suitable for work in connexion with the sanitary inspector's duties, also five certificates of merit in addition.

The judges appointed were Mr. T. J. Moss-Flower, C.E., F.G.S., Chairman of Council; Messrs. T. G. Dee and W. H. Grigg, Vice-Chairmen of the Council; Mr. S. C. G. Fairchild; and the Hon. Sec., Mr. E. Tidman, C.E., F.S.I.

The judges have made the following awards:—

Silver Medal.—Messrs. Oates & Green, Halifax, Yorks, for "General Excellence of the Exhibit."

Bronze Medal.—Messrs. Guest & Chrimes, Rotherham, Yorks, "General Excellence of Exhibit."

Certificates of Merit.—Messrs. Wilson & Stockall, Bury, Lancs, for their "Ambulance Appliances."

Mr. C. Duckering, Lincoln, for "General Excellence of Exhibits."

Messrs. Arnold & Co., Limited, Lincoln, for "General Excellence of Exhibit."

Mr. E. F. Arnold, Lincoln, for "Exhibit of Plumbing Defects."

Messrs. Lockerbie & Wilkinson, Birmingham, for "General Excellence of Exhibit."

COMPETITIONS.

THE NEW CENTRAL BOARD SCHOOLS FOR MORECAMBE.—The Morecambe School Board in October last bought a new site for central schools at a cost of 5,650*l.* The designs for the new buildings have been selected after a competition, the successful architect being Mr. J. B. Newton, of Morecambe. At a meeting a few days ago Mr. Newton met the Board, and was instructed to prepare plans and working drawings, and to supervise the erection of the structure. The schools will be in three departments, for boys, girls, and infants, the two latter being on the ground floor, with a board-room and boys' department above. The building will be a parallelogram in shape, on the central hall principle, and the work is estimated to cost 16,000*l.* Extensions are also contemplated at the Bare School.

INFECTIOUS DISEASES HOSPITAL FOR LINLITHGOW.—The competitive plans of Messrs. John Melvin & Son, architects, Alloa, for a new infectious diseases hospital to be erected at Linlithgow have been accepted by the Joint Committee of the Burgh and District Committee of the County Council. Accommodation will be provided for twenty-four beds, and the estimated cost is between 6,000*l.* and 7,000*l.*

LEEDS CORPORATION MARKETS.—At a meeting of the Leeds Corporation Markets Committee on the 21st inst., the report of Mr. William Emerson, President of the Royal Institute of British Architects, on the designs which the Corporation have received for the erection of a new market hall and shops in Vicar-lane, was submitted. The committee will shortly meet to consider the plans, together with the report of the assessor.

SEWAGE-SLUDGE DISPOSAL BY NATURAL AGENCIES.

AT the recent engineering conference of the Institution of Civil Engineers (in June last), Dr. G. Sims Woodhead read the following paper on "Sewage-Sludge Disposal by Natural Agencies."

"In this matter of sewage-sludge disposal is practically involved the crux of the sewage question, as from recent investigations and experiments it has been proved that it is a comparatively easy matter to bring about the disintegration of organic matter held in solution, especially if the solution be sufficiently dilute. The proportion of sewage matter held in suspension to that in solution is comparatively small, but, owing to the fact that it is solid, there has been a difficulty in dealing with it, unless it could be removed from the sewage by sedimentation, precipitation, and screening, and buried, when the organisms of the 'living' soil very rapidly bring about its breaking-up. It has, of course, to be borne in mind that sewage sludge consists almost entirely of organic matter, and that if any large amount of inorganic matter finds its way into sewage, that it is from road surfaces or from yards, or is washed from the surface of loose soil. Such inorganic matter can only be got rid of by sedimentation, and unless it is got rid of we can never hope to deal successfully with the sludge, as no means of disintegration at present known will deal with quartz or clay, and the presence of these substances, especially the latter, must necessarily interfere greatly with any process of bacterial disintegration that has hitherto been devised.

With organic solid matter it is, however, I believe, perfectly possible to obtain good results. In nature, organic matter is dealt with not only in the soil, but on the surface of

the soil. If any organic matter be left exposed, on a gravel surface say, it will be observed that, although there may be a hard outer film formed in dry weather, as in the case of a mass of cow-dung, the centre, at first moist, in time becomes exceedingly soft, and gradually diminishes in quantity, so that when rain comes such a mass of cow-dung, though hard on the outer surface, is very rapidly washed away. In showery weather, the process goes on with even greater rapidity.

What takes place under these conditions? First of all we have in the moist mass an enormous development of anaërobic organisms, which, utilising some of the material as food, produce a series of substances which have the power of digesting or dissolving a considerable portion of the organic matter. In this process we have also produced gaseous and liquid substances, the former of which escape into the atmosphere, often giving rise to foul smells; the latter soak into the soil, there being attacked by other organisms. In wet weather, or when the mass remains moist, we have in addition the action of a series of aërobic organisms brought into play; these assist in the oxidation of the products formed by the organisms in the substance of the mass. Under these conditions, there is a more free escape of the gaseous products, and a washing-away of those products which interfere with the activity of the micro-organisms. In fact, all the soluble matter is washed away, and the mass of dung disappears, comparatively rapidly. If this mass of fæces be buried in the soil, the process may go on still more rapidly, and it will be found that the vile-smelling gases are so rapidly oxidised by the aërobic organisms that grow near the surface of a porous soil that not a trace of odour is met with.

All the methods of treating the solid matter of sewage that hitherto have achieved any success are those in which the processes of Nature have been applied under controlled conditions, which, of course, must to a certain extent be artificial. But the nearer these can be brought to the conditions observed in Nature, the more successful will they be in getting rid of or disintegrating solid organic matter. In a cesspool, which, as we know, seldom requires to be cleared out, the solid substance of sewage is gradually but surely disintegrated; but the great disadvantage of the cesspool is that the enormous amount of gas formed must find its way out somewhere, whilst, as the substances become liquid, we have leakages into the soil in all directions, so that a large quantity of imperfectly oxidised material accumulates in the neighbourhood of the tank, the sodden ground allowing of no aëration.

In the disintegration tank of Scott-Moncrieff and in the Exeter septic tank, the main part of the work done is this disintegration of solid material by anaërobic bacterial agencies. The solid material remains sufficiently long in contact with micro-organisms to be broken down—in fact, it remains there until it is broken down. There is this additional advantage, that there is constantly flowing over the surface of the breaking-down sludge a fluid in which the gases are dissolved as they arise from the decomposing organic matter, and which carries away a large proportion of the products of the life activity of these micro-organisms; the organisms are thus left free, ridded as they are of the effete products to which they give rise, to go on with their work energetically; indeed, this flow of water acts, to a certain extent, as does a shower of rain, except that the sewage does not contain oxygen, whilst the rain does. It is, of course, impossible for oxidation to go on at this stage in a septic tank, say, and, therefore, without special arrangements, offensive smells may be developed. As soon, however, as oxidation commences, as it must wherever aërobic organisms are able to live, we have a rapid transformation of these offensive gases into non-smelling gases, very frequently of much simpler composition, but always containing a considerable proportion of oxygen.

As to the disposal of solid organic matter, or sewage sludge, I maintain that it must go on in these artificial tanks as nearly as possible under the conditions met with in Nature if the process is to be successful. We must bring about rapid disintegration by anaërobic organisms, wash away all soluble and gaseous matter as soon as formed, and submit these to aëration, oxidation, and the action of aërobic organisms. Only thus can we best deal with the solid matter of sewage. By sedimentation in catch-chambers, separate out, as far as possible, all inorganic material. In the case of clay it is very difficult to do this, and the better plan, therefore, is to prevent, as far as possible, unsedimented surface water from getting into the sewage. It does not matter how concentrated the material to be acted upon may be, but it is very important that the super-natural fluid should not contain too large a proportion of organic matter on the one hand, and that, on the other, it should not contain too large a quantity of effete products—ammonias, methylamines, and the like, which interfere with the action of the anaërobic organisms, no organisms being able to do their work in the presence of too large quantities of their own effete products.

How far the rapidity of oxidation may be increased by the use of oxidising substances is a very important question, but one into which it is impossible to enter in a brief note of this kind."

BOOKS RECEIVED.

THE LONDON MANUAL, 1899-1900. (Edward Lloyd, Limited.)

PRACTICAL PLANE AND SOLID GEOMETRY, SCALES, CURVES, AND FATTERN DRAWING. By J. S. Rawle, F.S.A. (Simpkin, Marshall, Hamilton, Kent, & Co., Limited.)

Correspondence.

To the Editor of THE BUILDER.

ALDERSHOT MASONIC HALL COMPETITION.

SIR,—Your correspondent, "Competitor," is, I think, justified in complaining of the conduct of the Aldershot Masonic Hall Company; and the question arises, whether the company are not legally bound to fulfil the terms of their advertisement published in your issue of May 13 last. In it occurred the following paragraph:—"Premiums of 30*l.* and 10*l.* will be awarded for the two best (*sic*) designs, the premium of the selected design to be merged in the commission." Only one design was to be "selected," and a premium of 10*l.* was to be awarded for another, which was not to be "selected." The company announced that they did not bind themselves "to accept any design;" but it appears that they did bind themselves to award two premiums, irrespective of their "accepting" or "selecting" any design. They have now decided to award one premium, but to withhold the other. Are they legally justified in doing so?

As one of the competitors, I shall be glad to receive communications upon the subject from any of your readers who may have suggestions to offer.

GEORGE H. BLAGROVE.

7, *Mornington-crescent,*
Regent's Park, London, N.W.

The Student's Column.

ROADS: THEIR CONSTRUCTION AND MAINTENANCE.

PART I.—MATERIALS (*Continued*).

9.—ASPHALT AND ASPHALTE.

ASPHALTUM, or mineral pitch, is a massive variety of bitumen occurring in a number of widely-separated localities, and generally supposed to be the result of the decomposition of organic matter. Its chief sources are from the well-known pitch lake in Trinidad, and from Bermudez in Venezuela; but it also occurs in Cuba, Peru, and Mexico, as well as in various parts of Europe and the United States. In the two first-named localities it is found in a form known as *lake asphalt*, covering an area of several hundreds of acres of liquid pitch or bitumen, which, in contact with the air, gradually hardens. On the removal of the hardened superficial portions, the excavation is gradually filled up with the more liquid bitumen lying below. *Land asphalt* is a somewhat harder variety, originally derived from similar sources, but more indurated by prolonged exposure to the air.

Crude asphaltum contains water as well as various mineral and organic impurities. By heating to a temperature of 300 deg. or 400 deg. F., the water is driven off and the impurities settle to the bottom or form a scum on the top of the liquefied mass, which is then drawn off and is known as *refined asphalt*. The quantity of pure bitumen in the refined product varies considerably. In the Trinidad asphalt it amounts to about 56 per cent., but the Bermudez mineral contains a much larger percentage, the difference being due to the amount of finely divided earthy matter which has escaped separation in the refining process. The quality of the bitumen also differs considerably in various localities. Bitumen consists essentially of two parts, a yellow oily material called *petrolene* and a hard black brittle substance known as *asphaltene*. These two substances are not always present in the same proportion. An excess of petrolene causes the asphalt to melt at a low temperature, and renders it deficient in stiffness; while a large proportion of asphaltene causes it to be brittle and wanting in the plasticity and cementing power requisite for the production of a good pavement. Refined asphalt consists chiefly of asphaltene, and is, therefore, too brittle to use in this condition. To remedy this defect it is mixed with mineral oil obtained from the distillation of petroleum, the asphalt having previously been liquefied at a temperature of about 300 deg. F. The quantity of oil necessary to produce the requisite state of consistency varies with the nature of the asphalt as well as with the quality of the oil itself. The mixture is continually tested with a weighted needle to ensure a proper degree of plasticity. Instead of residuum oil, liquid bitumen containing a large proportion of petrolene may be added to the refined asphalt to secure plasticity. By either of these means the brittle refined asphalt is thus converted into *asphaltic cement*.

This substance cannot, however, be used alone for the production of pavements, but must be mixed with sand and calcium carbonate in various proportions according to the conditions under which the pavement is to be used. In America the following proportions have been used:—

	Trinidad Asphalt.	Bermudez Asphalt.
Asphaltic cement....	12-15 per cent.	9-10 per cent.
Sand	83-70 " "	71-60 " "
Calcium carbonate ..	5-15 " "	20-30 " "

Instead of sand crushed granite may be substituted.

Good bitumen should not contain much foreign matter, such as water, earthy impurities, or volatile oil. It should not lose weight when heated for some hours to a temperature of 230 deg. F., and at ordinary temperatures it should be viscous; never brittle or fluid. It should also be capable of being drawn out into fine threads, which should only break when very slender. It is insoluble in water and alcohol, but may be dissolved in naphtha, benzol, carbon bi-sulphide, alkalis, and alkaline carbonates.

Artificial Asphalt is the pitch-like residue obtained by the evaporation of the more volatile constituents of coal-tar. It is inferior to the native product, and varies considerably with the quality of the coal and the temperature at which it has been distilled. The hardness of artificial pitch depends greatly upon the perfection to which distillation has been carried, and it is generally necessary to thin it down, by the addition of various tar oils, before using it for paving purposes. In the process of thinning it is important that only the heavy tar oils, such as green oils, are employed; for if creosote or naphthalene are employed for this purpose the pitch loses much of its binding or cementing power. As with the natural bitumen, it is necessary to impart firmness by suitable admixtures of sand, grit, gravel, chalk or lime, in the manufacture of asphalt for street paving, these ingredients being thoroughly incorporated with the pitch while in the molten state. It is said that the addition of about 5 per cent. of sulphur, added during the melting of the pitch, greatly improves the quality of the resulting asphalt, rendering it less fusible by the decomposition of some of the hydrogen compounds.

To avoid deception by the substitution of artificial asphalt in contracts in which the natural product is specified, it is well to submit the substance to the following test:—Extract with carbon disulphide, and filter off the liquid portion. The filtrate is then evaporated to dryness, and the residue heated until it is sufficiently hard to grind to a fine powder. This powder, about ·1 gram in weight, is treated for twenty-four hours with five cubic centimètres of strong fuming sulphuric acid, and then stirred with twice its volume of water. If coal-tar pitch is present, the solution will be of a dark-brown or black tint; but natural bitumen will give a light yellow solution.

Rock Asphalte.—In the case of the above-mentioned products, bitumen, either natural or artificial, is incorporated with various rock substances, such as sand, &c., to produce a pavement. The bitumen, in this case, plays the part of a cement which not only binds the ingredients together but also renders the whole mass compact and impermeable. In various parts of Europe, however, there are natural bituminous rocks, chiefly limestones, which contain such a proportion of bitumen that the whole rock softens under the influence of heat and consolidates again on cooling. The bitumen in these rocks is so thoroughly incorporated that it is superior for many purposes to the asphalts made by addition of bitumen to sand and limestone. These bituminous limestones are known as *asphalte rock* to distinguish them from the mineral asphaltum previously described. They occur in seams in the limestone deposits of various parts of Europe, and are worked cheaply at the following places, viz. :—Val de Travers, near Neufchatel, in Switzerland ; in Seyssel, in the department of Ain, France ; Lobsaun, in Alsace ; Maëstu, in Spain ; Limmer and Norwohle, in Germany ; and at Ragusa, in Sicily. The composition of these rocks varies considerably, as is shown by the following analyses by M. Durant Claye :—

—	Val de Travers.	Lobsaun.	Seyssel.	Maëstu.	Ragusa.
Water and volatile matter (100 deg. C.)	·35	3·4	·4	·4	·8
Bitumen	8·7	11·9	9·1	8.8	8·85
Sulphur, free or organically combined	·08	4·99	—	trace	—
Iron pyrites	·21	4·44	—	—	—
Alumina and oxide of iron	·3	1·25	·05	4·35	·9
Magnesia	·1	·15	·05	3·85	·45
Lime	49·5	38·9	50·5	5·7	·49
Carbonic acid	40·16	31·92	39·8	8·15	39·4
Combined silica	—	—	—	11·35	—
Sand	·6	3·05	·1	57·4	·6

The rock of Maëstu differs from the others in being a bituminous sandstone. The calcareous asphalte rocks, which are principally employed for pavements, are chocolate brown in colour when first extracted ; but, when exposed to the atmosphere, they undergo a superficial change, assuming a grey tint and resembling ordinary limestone. This is due to a loss of bitumen from a thin outside layer, leaving a film of ordinary limestone on the surface. The rock when broken takes an irregular fracture, without any trace of cleavage. Its specific gravity is about 2·23, and it is hard enough to require a hammer to break it. When warmed it softens to the consistency of paste, but heated to about 140 deg. F. it falls to powder. In grain it is regular and homogeneous, the finer the grain the better being the quality. So completely is the bitumen incorporated that the rock shows no trace of its calcareous matrix, although occasionally it is veined or contains large calcite crystals impregnated with bitumen.

It is important that rock asphalte for pavements should contain not less than 7 per cent., nor more than about 12 per cent., of bitumen. Too large a proportion of bitumen causes the pavement to soften and assume a wavy surface in warm weather, while too small an amount renders the asphalte incapable of binding properly, and unable to bear the pressure of heavy traffic. A smaller proportion of bitumen, however, will suffice for footpaths and courtyards where the traffic is light.

The percentage of bitumen in asphalte-rock may be readily determined by extraction with a solvent, such as carbon bi-sulphide, Russian oil of turpentine, ether, or coal-tar benzene. The sample is air-dried and stirred in a glass vessel with the solvent, which is then poured off and allowed to evaporate. The bitumen remaining after evaporation is then weighed and exposed to a temperature of 428 deg. F., in a lead bath. Any loss of weight will represent the proportion of volatile oil present in the bitumen, which should be almost inappreciable in a good sample. The residue left in the glass vessel after the solvent is poured off should be almost pure limestone, white and soft, and not rough or darkened by the presence of organic matter, iron pyrites, silicates or clayey matter.

The whole of the bituminous matter may be extracted from asphalte rock by petroleum, which acquires a deep brown colour ; whereas the imitation varieties made from coal-tar pitch give a characteristic green fluorescence when thus treated.

Asphalte rock is used in two ways for the construction of pavements, viz., *compressed* for heavy traffic, and as *mastic* for lighter traffic on footpaths. In the manufacture of compressed asphalte the following process is usually adopted :—Large pieces of rock, weighing from ¼ cwt. to ½ cwt., are placed in a Blake's, or other form of crusher, where they are broken to small pieces of the size of a pigeon's egg. These are then pulverised in a machine known as "Carr's disintegrator." The resulting powder is small enough to pass through a sieve of ·1 square inch mesh. It is then heated in roasters, with revolving cylinders, to a temperature of about 250 deg. F. until all moisture is eliminated, and transferred quickly to the place where it is to be laid, in specially-constructed vans to avoid loss of heat in transit.

Mastic Asphalte.—The powdered asphalte as made in the above-described process is boiled in large cauldrons capable of holding about two tons, and provided with agitators driven by steam. A certain proportion of refined Trinidad bitumen is first melted in the cauldron, the amount varying from five to eight per cent. of the whole mixture, according to the proportion of bitumen present in the asphalte rock used. The powdered rock is added gradually, and kept well stirred by the agitators for about five hours, the temperature being maintained between 390 deg. and 480 deg. F. In some cases the cauldrons are on wheels so that they can be transported to the place where the material is to be used, in other cases the substance is turned out into moulds, forming cakes, which are remelted in the street cauldrons. Before use a certain amount of grit or powdered stone is added. This is usually not larger than the size of peppercorns, and may vary in amount from 20 to 60 per cent. according to the desired result. The more grit the more difficult is the material to spread ; but the path is rendered more durable, and the cost of the material is diminished by its addition. The perfect adhesion of the grit and asphalte is seen on a broken surface, the fracture often passing through the grit particles themselves instead of these breaking out intact. The object of the added bitumen is to act as a flux, and its quality has an important influence upon the resistance of the pavement to wear and climatic influences. Artificial bitumen made from petroleum refuse or gas tar must on no account be used, as it renders the asphalte weak and easily softened. The apparently simple composition of natural asphalte rock and the cheapness of coal-tar pitch has led to many artificial varieties of asphalte pavements. These, however suitable they may be in certain cases, have not the durability of the natural substance, and have not proved themselves capable of sustaining the heavy traffic of cities. A variety of ingredients are used in the manufacture of these imitations, which consist essentially of tar and lime, stone, sand, grit, pulverised iron ore or slag with a certain amount of pitch.

Tar paving or tar macadam is a kind of concrete formed by mixing tar with limestone, calc spar, or grit, whereby an impervious road somewhat similar to asphalte is obtained. For this purpose only soft rock material such as limestone would be suitable, owing to the inequality of wear which would result from the use of harder substances, whereby an uneven surface would be quickly produced. The following proportion of materials for tar footpaths is given in the "Municipal and Sanitary Engineer's Handbook" :—

Engine ashes	12	barrow loads.
Screened slaked blue lias lime	4	" "
Small spar or sharp grit	4	" "
Best gas tar	34	gallons.
Water	80	gallons.

The dry materials are first mixed together, the tar and water being gradually added as in mixing concrete. The resulting mass, which should have the consistency of mortar, is then passed several times through a pug-mill to secure thorough incorporation, when it will be fit for use.

For roadways the macadam is either mixed with tar before laying, or a boiling mixture of creosote oil (50 gallons) and pitch (1 ton) is poured on the laid stone so as to fill the interstices, the top being spread with small stone, and the whole well rolled.

The advantages of asphalte pavements are numerous. They are absolutely impermeable, and their durability is increased by their elasticity and gradual compression. This compression goes on for at least two years after it is laid, and during this time the actual wear at the surface is almost nil. For quickness of laying and ease of traction it is scarcely excelled, and it possesses freedom from both noise and dirt. As regards foothold, it is not so satisfactory, being inclined to slipperiness when damp, and rendering the stoppage and starting of heavy traffic difficult. It is also quite unsuited for gradients higher than 1 in 60.

The peculiar sensitiveness of asphalte pavements to extremes of temperature is against its use in many countries, and may account for the fact that in the United States, where there is often an annual range of more than 100 deg. in temperature, this form of pavement is not held in so much esteem as in France and England. Its tendency to slipperiness when damp, also, must be considered in localities where the climatic conditions are abnormally humid. It is much more suitable for the dry climates of Berlin or Paris than for the damp atmospheric conditions of many towns in the British Islands.

Some of the above-mentioned objections to the use of asphalte seem likely to be more or less overcome by the manufacture of asphalte blocks, of which several varieties are being made in America, as well as in this country. It is claimed that these blocks are as silent as wood, more durable, and do not soften in the sun. It is certain that they are not so slippery, and from a sanitary point of view, they are quite as good as compressed asphalte.

OBITUARY.

MR. WILLIAM SIMPSON.—The death of Mr. William Simpson, Hon. Associate of the Royal Institute of British Architects, occurred on the 17th inst. at Willesden. Born in Glasgow in 1823, says the *Times*, he came with the repute of an expert in lithography to Messrs. Day & Son in 1851, and on the outbreak of the Russo-Turkish War in 1853 was despatched to the Crimea to make sketches of the campaign. His sketches were first sent to the Queen, and secured him the Royal favour, which led to a series of commissions in following years to paint many incidents of the reign. In 1866 Mr. Simpson became war correspondent to the *Illustrated London News*, and he remained in the service of that paper for many years, taking part in a number of events of public importance. He accompanied the Prince of Wales to India in 1875, and two years afterwards followed in the wake of Dr. Schliemann, challenging the validity of that explorer's conclusions. He showed considerable interest in archæological and architectural matters, and contributed to the Royal Institute of British Architects several papers—among others "The Classical Influence on the Architecture of the Indus Region and Afghanistan," "The Origin and Mutation in Indian and Eastern Architecture," "Mud Architecture : Notes made in Persia and Other Countries." His varied journeys were detailed in a volume entitled "Meeting the Sun," and his studies in religious symbolism are focussed in his recently-published "Buddhist Praying Wheel," while supplemental to this is a work on the Jonah legend.

MR. J. H. WHITAKER.—Mr. John H. Whitaker, builder and contractor, of Shipley, who was associated with the firm of Messrs. S. Deacon & Co., of Shipley, died at his residence in Birksland-road, Shipley, on the 22nd inst.

GENERAL BUILDING NEWS.

YSTRAD MEURIG CHURCH, CARDIGANSHIRE.—On the 17th inst. the Lord Bishop of St. Davids consecrated the new Church of St. John the Baptist at Ystrad Meurig, built in memory or Edward Richard, the pioneer of Welsh education and the founder of Ystrad Meurig school. The church consists of a nave, chancel, and organ-chamber. A massive western tower and vestry remain yet to be built. The style adopted is founded on late fifteenth century work. Red Hollington stone has been employed for the tracery and dressings, the main body of the walls being built with local stone. The roof, seats, and other internal woodwork are stained green. The building has been carried out by Messrs. Charles Davies & Co., of Llanfarian, near Aberystwyth, from the design of Mr. Harold Hughes, architect, of Bangor.

ST. SAVIOUR'S CHURCH, ARKLOW, IRELAND.—This church was consecrated on the 12th inst. The building, which was designed by Sir Arthur W. Blomfield & Son, consists of nave, north and south aisles, transepts with chancel, chancel aisle, vestry, and organ-chamber, and, like the old parish church, is in the Early English style. At the western end is a tower and spire, 150 ft. high, and containing a peal of bells and a large clock. The external walls are built with rock faced granite from Lord Carys-

fort's estate, with dressings of Monk's Park stone' the internal facings and dressings being chiefly of Corsham stone, with green Connemara marble shafts. The whole of the roofs are covered with lead. The open roofs and ceilings are of oak, that of the nave being vaulted with richly carved bosses at the intersections of the groin ribs. The chancel ceiling is formed with a series of carved moulded panels, supported on moulded and carved brackets, and enriched with carved bosses. The floors of the passages, chancel, and lobbies are laid with mosaics, and the spaces occupied by the seats with oak blocks. The whole of the fittings, including the seats, clergy and choir stalls, pulpit, organ case, communion table and rails are made in walnut; the screen and internal lobbies are of oak, and the fittings in the vestry of pitch pine. The reredos is of Corsham stone, with Connemara marble shafts. Just above the communion table is a sculptured panel of the Last Supper, flanked by mosaic panels, while above is the great east window, filled in with stained glass. The west window is also in stained glass, the other windows being in ornamental lead glazing. The contractors were Messrs. J. Thompson & Co., Peterborough.

Wesleyan Methodist Church, Barrow.—A new Wesleyan Methodist church has just been opened in Abbey-road, Barrow. The church has a broad nave, two transepts, chancel, narthex, organ chamber, choir vestry, ministers' vestry, and class-room, with a church parlour above to hold 130, and having direct lift connexion with a kitchen in the basement next the heating chamber. The main elevation is faced with Yorkshire parpoints and St. Bees red stone dressings. At the Abbey-road and Brighton-street angle of the church, a tower has been designed, containing the steps leading to the end gallery over the narthex, and surmounted by a spire rising about 100 ft. from the ground. At the other angle an additional entrance without a porch is provided. The internal woodwork in roofs, ceilings, benches, screens, &c., is in selected pitch pine. The windows and screens are glazed with ornamental lead work. The entrances, narthex, and chancel are tiled. The church will be heated with hot water on the low pressure system, and the lighting will be by means of an electrical installation. In addition to the seats in the nave and transepts, there are transept and end galleries, which altogether will provide accommodation for about 750 worshippers, including a choir of twenty-four in the chancel. On the left hand side of the church a school has been designed with infants' rooms and three class-rooms to seat 410 scholars, and about 685 for meeting purposes. The main school will be provided with a gallery at one end. The church has been built from the designs of Messrs. William Waddington & Sons, of Manchester, and the work has been carried out by local tradesmen.

New Wesleyan Church for Walsall.—On Wednesday the memorial stones of a new Wesleyan Church, which is being erected at the Pleck, Walsall, at the junction of the Wednesbury and Darlaston roads, were laid. The new building is being erected from plans prepared by Mr. C. W. D. Joynson, architect and Mayor of Wednesbury. The builder is Mr. W. T. Lees, of Darlaston. The building will be cruciform on plan, with nave of 42 ft. span, transepts 22 ft. span, and a gallery will be at the western end. At the eastern end of the church will be the chancel, with seats for the choir. At the north-west corner will be a square tower, in which will be formed a staircase leading to the gallery, and at the south-west corner a hexagonal staircase, also leading to the gallery.

School, Glasgow.—The new Wellfield School was formally opened on the 12th inst. by the Springburn School Board. It is situated at the junction of Balgray-road and Montgomery-street. The accommodation is, approximately, for 1,000 pupils. In the basement is placed the recreation and drill shed, occupying, with its store-room, the entire rear side, 74 ft. by 25 ft., and having direct entrance from the boys' playground, as well as from the main school. In the basement are also to be found the class-rooms for the handicraft section. The girls' class-rooms are on the east side of the building, and comprise one for laundry work, measuring 30 ft. by 25 ft. with drying chamber 23 ft. by 12 ft.; and a cookery-room, 26 ft. by 25 ft. At the boys' end is placed a workshop, 36 ft. by 25 ft., and also the boiler-house, with equipments for heating the school. On the ground floor is a suite of class-rooms for the lower school. The entire south side of the school is occupied by the infant class-room, 74 ft. by 25 ft., and capable of being sub-divided by sliding doors. Girls' class-rooms, with sliding partitions, and measuring 55 ft. by 25 ft., occupy the east front of the school, while at the boys' end class-rooms exactly similar are placed, with frontage also to Balgray-road. Entrance to the class-rooms is made from a vestibule running the full length of the school. A private room for the headmaster is placed near the boys' entrance, and a similar room for the headmistress at the girls' entrance. The vestibule measures 110 ft. by 13 ft., and is lit from above and by end windows. The stairs leading to the upper school are placed at either end of the vestibule, and open on a corridor measuring 76 ft. by 13 ft., well lighted from the roof. Cloak rooms and rooms for assistant teachers enter from half-landing on the main staircase. From the corridor in the upper school there branch two class-rooms for seventy-two pupils and five class-rooms for sixty pupils each. The height of the class-room ceilings on this and the ground floor is 14 ft., and in the basement 11 ft. The flooring throughout is of pitch pine, and the woodwork partitions are of yellow pine. A two room and kitchen house, with scullery and other accommodation, is also attached for the use of the janitor of the school. The boys' entrance is from Balgray-road, from which a slope leads to the playground, which is paved with concrete and granolithic. The girls' entrance is from Montgomery-street, on which level is their playground, separated from that of the boys by a boundary and retaining wall. The work was carried out from the designs of Mr. James Lindsay, architect, Glasgow.

Board School, High Wycombe.—The foundation-stone has just been laid of the new Infant School, High Wycombe, which is to be built in the Gordon-road. The building will be constructed of red brick, with stone dressings, and slated. The infants' room proper will be provided with desks for 108 children, the dimensions being 45 ft. by 24 ft. This apartment will be divided by a folding partition, which will make two rooms, each 22 ft. by 24 ft. There will also be a room for very young children, 19 ft. 6 in. by 21 ft. 6 in., with a gallery and desks for forty-four children. Then there will be a class-room, 28 ft. by 18 ft., with desks for forty-eight children, making the total accommodation that of 200. A special entrance hall, with hat and cloak room and lavatory, will be provided, with the usual offices at the rear. Messrs. C. E. Moxham & Sons, of Wycombe, are the architects; and Messrs. A. W. Morton & Son the builders.

Business Premises, London-road, Liverpool.—New premises for the Liverpool Furnishing Company are being erected in the London-road. The site has a frontage of 45 ft. to London-road, with a depth to Hart-street of 80 ft. The front of the building will be five floors in height, while the frontage to Hart-street will consist of only four floors. The elevations will be treated with pilasters up to the main cornice, and between the pilasters will be arched openings for show windows. The main entrance will be in the centre of the London-road front, the shop-fronts to be of carved Spanish mahogany. An illuminated clock will be placed in a turret at the corner of London-road and Hart-street. The contractors are Messrs. Roberts & Thomas, Kirkdale, and the architects Messrs. W. Hesketh & Co.

Hotel, King-street, Hammersmith.—The "Lord Raglan" Hotel, which has been erected on the site of the old premises of that name, was opened on the 14th inst. The architects were Messrs. Lewcock & Callcott, and the building was erected under the supervision of Mr. W. Robertson.

Proposed Masonic Hall and Club, Richmond.—It is proposed to erect a Masonic hall and club at Richmond, on the site now being cleared for the purpose between the Fire Engine Station and the Primitive Methodist Chapel, at the commencement of Sheen-road. Plans have been prepared by Mr. Frank Brewer, architect, of Richmond. They include a public hall, having a vestibule, retiring-rooms, &c., and provided with the necessary emergency exits. There will also be a suite of offices to be let off. Under the large hall there will be a lodge-room for Masonic purposes, the larger hall being available for the banquets. For the use of a Masonic club there is a set of club chambers.

Parr's Bank, High Holborn.—The new premises are nearly completed. They stand on the site of Nos. 121-6, between Southampton-street and Southampton-row, and are built by Messrs. J. Simpson & Son from the plans and designs of Messrs. Ford, Son, & Burrows.

Kirkstall Abbey.—The Leeds Corporation have decided to erect a building at the entrance to the Abbey grounds to serve the purposes of a waiting-room at the tram terminus, a tramways office, and a gardener's lodge. Between the waiting-room and office on the one side and the lodge on the other there will be a gateway. The building will encroach but little on the Abbey grounds. It is to be entirely faced with stone, and will be surmounted by the arms of the Corporation, and a copy of the seal of the Abbey. The designs have been drawn by Mr. Henry Walker, architect, Leeds. The premises are to include lavatories.

The New Infirmary, Newcastle.—At a meeting of the New Infirmary Building Committee on the 17th inst., the report of Mr. A. Waterhouse, R.A. (the committee's assessor) on the competitive designs was received and adopted, and Messrs. W. L. Newcombe and H. Percy Adams were appointed architects of the new infirmary. Mr. J. P. Allen was appointed quantity surveyor for the new building.

The Helen Faucit Memorial.—It is stated that Mr. G. F. Bodley will be asked to furnish the design for a pulpit which Sir Theodore Martin intends to erect, at a cost of 1,000*l.*, in the church at Stratford-on-Avon, as a memorial to Lady Martin (Helen Faucit). Sir Theodore Martin has presented to the library at Stratford the first folio copy of Shakespeare's plays formerly owned by Lady Martin; it is further proposed to erect a "players' window" in the church with subscriptions to the fund which Mr. Ben Greet had already collected for a "players' pulpit."

SANITARY AND ENGINEERING NEWS.

The Proposed New Tyne Bridge.—The report of the New Tyne Bridge Committee regarding the projected bridge from Pilgrim-street, Newcastle, to High-street, Gateshead, mentions that the estimated cost of the new bridge is 560,000*l.* Of that sum 200,000*l.* would be required for bridge structure extra width and weight, as agreed upon by the Joint Committee, flagging and paving new portions of streets at each end of the bridge, and also widening of arch and roadway under the North-Eastern Railway, Pilgrim-street, Newcastle, as estimated by Messrs. Sandemann & Moncrieff, the engineers. The sum of 250,000*l.* would also be required from the total, for properties to be acquired on the Newcastle side; 76,000*l.* for properties to be acquired on the Gateshead side; 11,500*l.*, interest on capital during construction, and 22,500*l.* engineering expenses, law charges, and contingencies. It was estimated that of the 250,000*l.* worth of property to be acquired on the Newcastle side, about 100,000*l.* would be absolutely sunk in demolitions and alterations, leaving about 150,000*l.* to be obtained from re-sales.

Morecambe Sewerage.—The Local Government Board have given their sanction to the Morecambe Sewerage Scheme. The inquiry into the application of the Council to borrow 60,000*l.* for the purposes of this scheme was held in October last year, and at the time strong representations of special urgency were made to the Inspector, Colonel Coke. The outfall works, however, were at a point within the boundaries of the parish of Heysham, and the scheme has been subjected to strong opposition from this quarter. The scheme has now been sanctioned practically in the form in which it was submitted, with an amended estimate of 62,500*l.*, 2,500*l.* being asked for since the inquiry. The only condition attaching to the sanction is a recommendation that the sewage shall not be discharged during the period of two hours before and two hours after the time of low water. The work is expected to take something like three years to complete. The scheme, which is the work of Mr. H. Bertram Nichols, A.M.Inst.C.E., of the firm of Beesley, Son, & Nichols, Westminster, was accepted by the Council as a result of an open competition in January of last year. The sewage will be dealt with on the septic system, and the scheme is of a tripartite character, being intended to provide for a resident population of 15,000 in the winter, 25,000 in the spring and autumn, and 45,000 in the summer, with a maximum capacity for dealing with the needs of a population of 60,000 people. The pumps and machinery will be arranged to work in three sets accordingly. There will be eight septic tanks and a tidal culvert capable of containing 800,000 gallons, where the sewage will be retained till an hour or more after high water, when it will be discharged into the bay at a point on the Heysham foreshore called "Seldom Seen."

Bridge, Murrayfield, Edinburgh.—The removal of the stone bridge which carries the Caledonian railway over the Edinburgh and Glasgow thoroughfare at Murrayfield, and the erection of a temporary bridge to enable the traffic to be resumed pending the erection of a new steel bridge, was carried out on the 20th inst. The work is being carried on by the Caledonian Railway Company and the Edinburgh Town Council. The operations were under the direction of Mr. W. A. Paterson, the District Engineer.

Sewering, Hendon.—Mr. W. O. E. Meade-King, M.Inst.C.E., an Inspector of the Local Government Board, held an enquiry on the 16th inst. at the public offices, the Burroughs, Hendon, into an application of the Urban District Council for sanction to borrow 4,713*l.* for sewering the Hale, &c., and 3,099*l.* for private (street) improvement works, &c. Mr. S. Slater Grimley, the Engineer and Surveyor to the Council, gave evidence in support of the application, and explained that about twenty miles of sewers have already been designed and carried out under his direction, the outfall works having been entirely remodelled by him, at a cost of about 50,000*l.* altogether, bringing up the total amount spent on sewerage by the Urban Authority since 1887 to about 130,000*l.*, and on private street and other works about 45,000*l.* The system of treatment at the outfall works is: 1. Chemical precipitation. 2. Clarification through sand and burnt ballast filters. 3. Bacteria filtration and land. The cost being about 1,200*l.* per annum, and the resulting effluent satisfactory; the population draining to the works being at present about 17,000. The Inspector, after visiting the outfall works and The Hale, promised to report in due course.

STAINED GLASS AND DECORATION.

Window, Greenhow Hill Church, Yorks.—A new east window has been placed in Greenhow Hill Church, in memory of the late Vicar. The window, which has been designed by Mr. C. E. Tute, is of three lights.

Window, Parish Church, Haslemere, Surrey.—A stained glass window, in memory of Tennyson, has just been unveiled in this church. The window was executed by Messrs. Morris & Co., from a design by the late Sir E. Burne-Jones.

FOREIGN.

FRANCE.—The paintings which were prepared by Puvis de Chavannes for the Panthéon, and which have been completed by his pupils, will be fixed in their place in October. The original sketches will be hung in a special gallery at the Luxemburg, along with the picture entitled "Le Pauvre Pêcheur," and about 200 studies presented by the family of the great painter.——The curator of the Greek and Roman antiquities at the Louvre has determined to collect in one gallery a number of works of special interest which are at present scattered about the museum. The most notable among these are a seated figure of "Rome" in porphyry; a statue of "A Barbarian Prisoner;" the bust of a priest of Isis, two colossal statues of barbarians, a large porphyry urn supported by winged griffins, and some columns said to have been brought by St. Louis on his return from the Crusades.——M. Saint-Marceaux has just completed his statue of Alphonse Daudet, which will probably be erected in the Champs Elysées. The statue by Falguière is intended for Nimes.——The building of houses has been commenced on the site of the old Mazas prison.——At Chambéry, on Sunday, the monument to the brothers Joseph and Xavier de Maistre, by M. Ernest Dubois, was inaugurated. The monument represents Joseph de Maistre standing on a rock, his left hand leaning on the shoulder of his brother, who holds a roll of manuscript. At the base is a female figure symbolising "Savoy," and holding a wreath of laurel towards the two other figures. ——The Service des Beaux-Arts of Paris is about to restore the monument erected under the Empire, at Saint-Seine, marking the place of the source of the Seine. The monument is the work of Dumont. ——At Orange a sculptured group by M. Injalbert has been set up, representing "Ancient Engineering and Modern Art."——The new museum of Arabian antiquities at Tunis was opened on Tuesday last. It contains a fine collection of statuettes, pottery, and Roman and Arabic inscriptions.——The death is announced, at the age of 77, of Mdme. Anaïs Toudouze, painter, widow of the late architect Gabriel Toudouze, and mother of the painter Edward Toudouze.

MISCELLANEOUS.

THE SANITARY INSTITUTE LECTURES AND DEMONSTRATIONS.—The twenty-eighth course of lectures and demonstrations for sanitary officers, arranged by the Sanitary Institute for Mondays, Wednesdays, and Fridays in September, October, and November, will comprise the following lectures:—Part I.—Six lectures on Elementary Physics and Chemistry in relation to Water, Soil, Air, and Ventilation; two lectures on Elementary Statistics, Meteorology, and Local Physical Conditions. Part II.—Eighteen Lectures on Public Health Statutes; Orders, Memoranda, and Model By-Laws of the Local Government Board, and the By-Laws in force in the Administrative County of London; the practical duties of a Sanitary Inspector—*e.g*, drawing up notices as to sanitary defects, drain-testing, disinfection, methods of inspection, note-taking, and reporting; Municipal Hygiene or Hygiene of Communities, including Prevention and Abatement of Nuisances, Sanitary Defects in and about Buildings and their Remedies, Water Supplies, Sanitary Appliances, Drainage, Refuse Removal and Disposal, Offensive Trades, Disinfection; Building Construction in its Sanitary relations; Measurement and drawing Plans to scale. Inspections and Demonstrations will be arranged in connexion with the lectures, and will include visits to Disinfecting Stations, Dairy Premises, Municipal Depots, Artisans' Dwellings, Offensive Trades, Waterworks, Common Lodging-houses, Sanitary Works in progress, Refuse and Sewage Disposal Works, and other public and private works illustrative of Sanitary Practice and Administration. In some of the visits the Students are shown the routine of an Inspector's Office Work and Duties. Part III. —Seven lectures on Meat and Food Inspection, including taking of samples of Water, Food, and Drugs for Analysis. Practical Demonstrations of Meat Inspection will be given. The various subjects to be dealt with will be given by well-known authorities, and will be illustrated with Diagrams, Drawings, Models, and Lantern Slides. The lectures will include the subjects scheduled for the Examinations of the Institute and the Sanitary Inspectors' Examination Board.

THE JOHN RYLANDS LIBRARY.—In October next will be opened the library in Deansgate, Manchester, built for Mrs. Rylands, in memory of her late husband, by Messrs. Morrison & Sons, of Liverpool, contractors, after the plans and designs of Mr. Basil Champneys. During ten years past Mrs. Rylands has gathered standard works, already amounting to nearly 70,000 volumes, for the equipment of the library, where special departments will be assigned to the Bibles and the Aldines, each of which collections is unique after its kind. The library can boast of fifty-one genuine specimens of Caxton's handiwork, with many other bibliographical treasures. One notable purchase made by Mrs. Rylands was that of Earl Spencer's world-famed library at Althorp.

THE DENTAL HOSPITAL, LEICESTER-SQUARE.—The Committee make an appeal for subscriptions towards a sum of 4,000*l.* on behalf of their building fund. The new hospital is being built, after the plans and designs of Messrs. Young & Hall, on the south side of Leicester-square, between Green and St. Martin's streets. The site and houses thereon, when bought by the hospital governors yielded a revenue of 1,200*l.* per annum, which they intended to accumulate, but it appears that the property was condemned sooner than they anticipated, whereupon, rather than dispose of the land, they decided to mortgage it, and to proceed with the new buildings, which, it is expected, will be ready before the close of next year. At the same time St. Martin's-street will be widened at its north end.

EEL PIE ISLAND, TWICKENHAM.—At the mart last week the island was sold, in twenty-three lots, for a total of 7,352*l.*, no offer having been made to purchase the property in its entirety. The hotel, with about 3½ acres of land, was bought for 3,200*l.*, and an adjoining plot, having a river frontage of 280 ft., for 1,250*l.* The other plots, consisting of small parcels of land with frontages of 20 ft. to the river or backwater, realised from 104*l.* to 280*l.* apiece, and will be utilised for boat-houses, bungalows, or camping grounds. For Glover's Island, further down the river, the highest bid offered last year was 200*l.*

RESIGNATION OF A SURVEYOR.—Mr. Tom Vickers has resigned his position as Town Surveyor to the Bexley Urban District Council.

THE GLADSTONE STATUE FOR GLASGOW.—The Glasgow Gladstone Statue Committee have decided to commission Mr. Hamo Thorneycroft, R.A., to execute the statue of the deceased statesman at a cost of 3,500*l.*

THE DEVELOPMENT OF SOUTHWOLD. — Messrs. Douglas Young & Co. sold at Southwold last Saturday a large number of plots to the value of over 7,000*l.*, at prices varying from 3*l.* to 4*l.* 10s. per ft. frontage. It was announced on behalf of the Coast Development Company that the construction of a pier will be at once proceeded with, and that a new boat is to be added to the fleet of the company, while the train service and accommodation is to be considerably augmented.

CAPITAL AND LABOUR.

BUILDING TRADE TROUBLES, LEEDS.—Recently there was a conference between the Yorkshire Federation of Master Builders and representatives of the London Order of Bricklayers. The result of that conference was that certain recommendations were drawn up for submission to the Leeds masters and the Leeds branch of operative bricklayers. These were to the effect that wages should be increased one halfpenny per hour, that the number of apprentices should be regulated by the number of bricklayers employed, and that no strike or lock-out should take place until the matter in dispute had been submitted to a Board of Conciliation. The men were balloted on these matters, and agreed to them with practical unanimity; and it was thought that they would be back at work as soon as matters of form had been got through. The masters, however, have refused to agree to the advance of wages, and, as to the other questions, have decided that a ballot of the members of the Association is necessary. A meeting of the Masters' Association was held on the 22nd inst. at the Exchange Club, to consider the ballot that had been taken on the proposed settlement with the London Order of Bricklayers. In the absence of the President (Mr. W. Nicholson), the chair was filled by Mr. W. H. Dews, the vice-president. It was reported that ninety-two papers had been sent out, and that there had been fifty-one returned. Of these, forty-eight were opposed to the advance, and the remaining three were in favour of it. Two of the three, however, were signed by members who do not employ bricklayers. After some discussion, it was decided to adjourn the meeting for a week with a view of seeing whether any further replies would be sent in.

YORKSHIRE BUILDERS' FEDERATION.—At a meeting of the Yorkshire Builders' Federation held at Leeds, on the 17th inst., the question of the attitude of the workmen engaged in the building trade of Hull was considered, and, after a lengthy discussion, under the chairmanship of Mr. J. Spink, of Sheffield, it was announced that the following resolution had been unanimously adopted:—"That this meeting of the Yorkshire Builders' Federation resolves, in consequence of the action taken by Union men in Hull in refusing to work with non-Union men, to fully approve of the course adopted by the Hull Master Builders' Association, and orders them to open their shops to all men at once as free labour shops, and they pledge themselves to support the Hull masters to the end, financially or otherwise."

DUNDEE PLASTERERS' LABOURERS.—The Dundee plasterers' labourers have come out on strike for an increase of wages. Their rate of pay at present is 5½d. per hour, and the men have asked an increase of ½d., which the employers have meantime met by an offer of ¼d. The men have declined to accept this.

KILMARNOCK JOINERS ON STRIKE.—The operative joiners of Kilmarnock have come out on strike in consequence of the employers having refused to concede an advance of ½d. per hour on the present rate of wages. The employers have signified their willingness to grant the increase six months hence, but the men have resolved to stand firm for an immediate advance. About a hundred men are affected. The present rate of wages is 8½d. per hour.

LEGAL.

WHAT IS A NEW BUILDING?

AT Chelmsford, recently, Messrs. S. J. Gannon & W. E. Gannon, machinists, Springfield, were summoned at the instance of the Chelmsford Rural District Council for erecting a building without first depositing plans or giving notice in writing of their intention to commence the work, as required by the Council's by-laws.

Mr. Dixon, who prosecuted, stated that some years ago the defendants erected a corrugated iron building, 23 ft. in length and 16 ft. in width, at the rear of their premises on Springfield Hill, and this building was enlarged from time to time. Since then the by-laws had come into force. The defendants recently commenced building another addition, about 12 ft. square, and the contention of the District Council was that plans ought to have been deposited in accordance with the by-laws. The defendants contended that it was not a new building, and that they were not liable to deposit plans, and this was the point which the Bench had to decide. The question was a very important one, for if buildings were to be added to in this way, a very small building might become a very large one, and its whole character might be entirely altered. It seemed only reasonable that any material alteration or addition of this sort should be subject to the by-laws.

Mr. J. Dewhirst, Surveyor to the Chelmsford Rural District Council, said the addition in question was being made to a workshop in which several persons were employed. He told Mr. W. E. Gannon that he ought to have deposited plans, but the latter said he did not think he was liable to do that.

Mr. Sutthery, in defence, stated that the question of a new or old building was a question of degree which must be determined by the Bench in each particular case. In this instance the whole area of the building was 1,216 ft., whereas the addition was only 125 ft. The Late Lord Chief Justice Coleridge laid it down that if a building were nearly all demolished and rebuilt it would be a new building, but that a small addition—say a door—would not make it a new building. Between these two extremes, said Lord Coleridge, there might be thousands of cases, and it was, therefore, impossible to definitely define what a new building was; and every case must be left to the Justices to decide upon the question of fact.

Mr. C. Pertwee, architect, Chelmsford, having given evidence,

The Justices left the Court for the purpose of inspecting the building in dispute, and, upon their return into Court,

The Chairman said they had made up their minds that this was a new building, coming under the by-laws. They imposed a fine of 5s. and costs 14s.

OBJECTION TO TRAMWAY BUILDINGS.

IN the Vacation Court on Wednesday, before Mr. Justice Cozens-Hardy, the matter of Iceton *v.* The London United Tramways Company, Limited, which stood over from the previous week, was in the list for hearing. This was an application on behalf of the plaintiff for an injunction to restrain the defendants from building on certain land. Mr. Alexander, Q.C., asked that the motion should stand over again, and that defendants should be ordered within reasonable time to state under which Act of Parliament they claimed to have power to acquire the property in question. In answer to a request for information on this point, defendants had simply tendered them nine Acts of Parliament. Mr. Marshall, Q.C., opposed any further adjournment, and after some discussion his Lordship ordered that the case should stand for trial in its ordinrry course.

CASE UNDER THE 1894 BUILDING ACT.

ON the 22nd inst. the Penge magistrates gave their decision in the case of the four summonses taken out by the London County Council against the Crystal Palace Company for an alleged infringement of the London Building Act, 1894, by erecting some polo stables in the grounds of the Palace without having first obtained the sanction of the Council.

Mr. Seager Berry represented the London County Council; and Mr. Cunningham Glen was for the Crystal Palace Company.

The chairman (Mr. James Judd) said the question the magistrates had to decide was whether the erections specified in the four summonses were subject to the provisions of the London Building Act, 1894. The erections were described as being a twenty-two stall stable, a loose-box, stable, harness-room, a forage-store, offices, and a shoeing-forge. If those erections were not subject to the provisions of the London Building Act of 1894, it was because they were exempted by virtue of Section 21 of

the Crystal Palace Company's Act of 1881. It seemed to be quite clear that no special exemption was made to the buildings of the company by the London Building Act of 1894, as was the case with various other erections and buildings in different parts of the county of London and of certain specified natures enumerated in the 201st and following sections of such Act. It was admitted, the bench understood, that if any section of the London Building Act of 1894 applied to the buildings, it was the section under which the summonses had been issued, namely, Section 82, Sub-Section 1, which was contained in Part 7 of the Act. That being so, it was essential to refer to the various private Acts of Parliament which had been obtained from time to time by the Crystal Palace Company. The first was that which was passed in 1853, when, according to the preamble, the building of the Great Exhibition of 1851 in Hyde Park was being re-erected near Sydenham, or, to be strictly accurate, in the hamlet of Penge, which was in the parish of Battersea. That re-erection was subject to the Acts 7 and 8 Vic, cap. 84, and 9 and 10 Vic., cap. 5. By Section 9 of the Company's Act of 1853 the buildings and conservatories of the company were expressly exempted from the operations of the Acts he had just mentioned, but only to the extent of such as were "not mainly constructed of masonry and timber," and for the reason, as stated in the preamble, that such buildings and conservatories were constructed of materials and in a method not contemplated by the Acts 7 and 8 and 9 and 10 Vic., in other words of glass and iron. This exemption, qualified and restricted as it was, had, in their opinion, no reference whatever, and was not intended to refer, to buildings in future to be erected, but only to the original exhibition building with the additions thereto, which were then in course of re-erection. In 1855 the Metropolitan Building Act was passed, and by it the two Acts of Parliament from which the Crystal Palace Company had been exempted by their own Act of 1853 were repealed, and, moreover, the Crystal Palace was not specially exempted by the Metropolitan Building Act, but was subject to its provisions. For a period of twenty-six years from that time there was no further legislation on the subject, but in the year 1881 the company obtained another private Act. By Section 21 of that Act the "main building, conservatories, and waterworks of the company, and the conveniences and other works immediately connected therewith," were exempted from the operation of Part I. of the Metropolitan Building Act of 1855. The magistrates were of opinion that the exemption conferred on the company by that section still remained in force, notwithstanding that the Metropolitan Act of 1855 had been repealed by the London Building Act of 1894, as they considered that such exemption was kept alive by Section 218 of the Act of 1894. Section 21 of the Act of 1881 extended or increased the exemption which the company had originally enjoyed, inasmuch as by inference it included such part of the main building or conservatories as were or should be chiefly composed of masonry and timber, and also included the waterworks of the company and the conveniences and other works immediately connected, not only with such waterworks, but with the main building and conservatories also. It also increased or extended such exemption in another direction. It now remained for the Bench to consider whether or not Section 21 of the Companies Act of 1881 exempted the buildings or erections, now the subject of their inquiry, from the operation of Part 7 of the London Building Act of 1894. Mr. Horace Avory, on the part of the London County Council, had contended that it did not have that effect, but Mr. Cunningham Glen had argued to the contrary. Were these stables, &c., "conveniences and other works immediately connected with the main building, conservatories, and waterworks of the company?" It was necessary to define the meaning of the word "connected." Mr. Glen argued that the word meant allied to or associated with the aims or objects of the undertaking of the company, and that as part of the undertaking of the company was to provide pleasure grounds, the provision of stabling, &c., for ponies used in playing polo in the grounds was "a convenience or other work" coming within the exemption. While the Bench could not accept that view of the meaning of the word "connected," they did not think that in order to claim the benefit of this exempting section the "convenience or other works" must of necessity be structurally attached to either the main building, conservatories, or waterworks of the company. Section 20, which they would read with Section 21, gave the directors the power to erect in the Crystal Palace grounds twenty cottages for their workmen, with "all suitable buildings and conveniences connected therewith." If these polo stables were "conveniences or other works immediately connected with the main building," they would unquestionably be free from the control of the London County Council. They might, no doubt, be conveniences or other works, but were they immediately connected with the main building, conservatories, or waterworks? In the magistrates' view the meaning of the words "immediately connected therewith" was that they were intended to apply to conveniences or other works closely appurtenant to or such as were required for use as adjacent appendages of the "main building, conservatories, and waterworks of the company." They held that the buildings in question could not be so described, and were therefore not exempt from the operation of Part 7 of the London Building Act of 1894. They had therefore decided to convict on each of the four summonses. It might be that the Crystal Palace Company might very well be allowed to erect buildings without first of all having to submit plans for the approval of the L.C.C., but such was not the law. They would impose a penalty of 10s. and 7s. 6d. costs in each of the four cases, with an extra five guineas on the first summons, and in the exercise of their discretion they would not require the Crystal Palace Company to obtain the approval of the London County Council for the erection of these buildings, as they had already been completed, and were such as the Council would have approved of. Nor would the Bench order the stables to be demolished.

Mr. Glen intimated that the Crystal Palace Company would carry the case further.

The Chairman said the question raised was a very important one, and the Bench would do anything they could to facilitate any action of the company. They would willingly state a case.

Mr. Glen said the usual notice would be given.

MEETINGS.

SATURDAY, AUGUST 26.

Incorporated Association of Municipal and County Engineers.—Western District Meeting, Portland.

Northern Architectural Association.—Excursion meeting. Brancepeth Castle, &c., will be visited.

AUGUST 29 TO SEPTEMBER 2.

Sanitary Institute.—Congress at Southampton.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until October 16.

[1898.] 16,869, Roche, Structure for Use for Decorating, Painting, &c. 17,026, Reason and Mutual Electric Trust, Electrical Meters. 17,620, Clarke & Mackenzie, Screw and Nut Mechanism. 18,176, Beckett, Gate or Door Fastener. 18,181, Rodney, Catches and Locks for Doors. 18,729, Pfister, Enamelled Cloisonné. 19,149, Goodwin, 20,122, Wallin & De Wendel, and [1899] 13,339, Pauli Lamp Company, Generation of Acetylene Gas. 19,385, Boyle, Burners for Burning Hydro-Carbons. 19,398, Stent, Gas Burners. 19,608, Scott, Combination Circular Saw-Guard and Riving Knife. 19,779, Mœller, Incandescent Lamps. 19,782, Maiche, Apparatus for Sterilising Water. 20,163, Longsdon, Driving Mechanism for Washing and similar Machines. 20,277, Adler, Tubes. 21,109, Warburton, Hammers, Picks, &c. 21,379, Farrer, Manhole Covers for Drains, &c. 21,467, Verity's & Steele, Alternating Current Transformer. 21,493, Fränkl, Apparatus for Testing whether Pipes or Tubes are Fluid-tight. 21,829, De Marçay, Incandescent Electrical Lamps. 22,914, Miller, Safety Fittings for Roofs and Windows. 25,413, Beacock, False Bottom for Domestic Fire Grates, &c. [1899.] 587, Winterflood, Water Heaters and Automatical Valve Attachments. 2,296, Jacobsohn, Filters. 3,290, Böhndel & Yeaton, Manufacture of Combustible Gas. 5,352, Lewis, Lewis, & Dent, Bricks. 5,838, Condict, Elevator and Transfer Crane for Storage Batteries. 6,267, Stumpf & Lenz, Sash Windows. 7,411, Cheshire, Geographical Models and Relief Maps. 10,509, Von Pallich & Knaus, Compasses and Ruling Pens, &c. 10,874, Wicke, Manufacture of Tiles, Slabs, &c. 10,891, Daloze, Cocks or Valves. 11,050, Büchi, Adjustable Tool Holder. 11,104, Wicke, Roofing Tiles, Slabs, &c. 11,649, Correll, Drying, Heating, Cooling, and Impregnating Granular and other Material. 11,743, Proskey, Hydro-carbon Vapour Lamps for Incandescent Lighting. 13,641, Schratzenstaller, Means for Automatically Preventing the Freezing of Water in Pipes. 13,898, Brügmann & Prochnow, Cooking Apparatus. 13,999, Henning & Higgs, Pipe Couplings. 14,125, Von Suchorzynski, Apparatus for Copying Carvings in Wood, Stone, &c. 14,261, Horry, Method of Producing Carbide of Calcium. 14,291, Winser, Automatical Siphon Flushing Tanks. 14,300, Callmann, Primary Batteries. 14,353, Goodman, Friction Testing Machines. 14,385, Dalbarade, Taps. 14,401, Weidlich, Invisible Adjusting Apparatus for Electroliers, Gaseliers, &c. 14,405, Goldstücker, Closing of Sheet Metal Tins, Cans, or other Vessels.

ABSTRACTS OF PATENTED INVENTIONS.

9,226.—ACETYLENE BURNERS: *C. L. Lauri.*—A wire within the burner is used to remove carbonaceous deposits from the burner orifices. It is passed through by screwing the burner head up and down the tube on which the wire is mounted. For duplex burners the wire is mounted upon a solid screw. The burner tips are formed of steatite, glass, &c., and a washer prevents the escape of gas.

9,256.—BUILDING APPLIANCES: *L. Broussas.*—The invention embodies a process of making arch stones for bridges, beams or girders, columns, shafts, wall copings, conduit pipes, gasometers, rafters, roofing tiles or slabs, spires, and so on, from cement, concrete, slag, asphalt, &c., in which T-irons are embedded. For rafters the cement is cast in a frame consisting of two lengths of T-irons with wire connexions; fishplates join the rafters to the columns and to one another, the roofing being made of tiles cast in an iron frame, which is built up of angle and T irons. For a solid or hollow post having four T-irons connected by wires, and with their webs cast in the substance, a series of plates for receiving the flanges are set at intervals in the post, and in the case of a chimney-shaft the plates are replaced with a notched hoop.

9,265.—ARTIFICIAL STONE AND TILE COMPOSITION: *G. C. Levey & C. L. O'Brien.*—The compound is prepared by mixing magnesia or calcined magnesite, magnesium chloride, and oxide of zinc, or similar paint or putty with slate or stone refuse or sand, together with water; it may then be moulded into the shapes desired.

9,276.—DISINFECTION OF URINALS, WATER-CLOSETS, DRAINS, &c.: *J. L. Wade.*—The soluble disinfectant is put in to a vessel having a siphon outlet and an inlet, the vessel being placed within the flushing tank so that it may be filled and emptied at the same time with the flushing tank; it may also be put inside a watering cart.

9,280.—SHEET-METAL HUTS, ROOFS, WALLS, &c.: *E. L. Pease.*—The contrivance constitutes an improvement of the methods of construction set out in No. 21,331 of 1896, whereby slotted tubes engage with flanged panels or sheets which are stiffened by being curved; between the inlets or flanges of the panels are placed distance pieces of wood or of metal, stiffening pieces are inserted between the tubes, and thin lath linings for the panels are sprung in between their inset edges to provide an air space between the panel and lining; the latter are held apart by means of a distance piece, the stretcher being scalloped in order that the air spaces may be continuous. For sloping roofs the tubes are inclined and the lengths of panelling overlap, whilst flat roofs may be constructed of a number of tubes having panels between them.

9,306.—GAS COOKING STOVES AND HOT PLATES: *G. E. Wright.*—The hot-plate is so joined together as to afford access to the burners supported at their rear ends by the plate's frame. The top of the plate is hinged to the frame, which has a weighted catch engaging a hook upon the plate's top when shut down. The gas-supply nozzle and the burners are carried by bars; recesses in the lower bars, at the nozzles, together with flat plates on the burners, form a mixing-chamber; and webs upon the burners prevent the top from being dislodged when it is shut down.

9,328.—WELL DOORS FOR CAGE LIFTS: *J. Botterill & R. E. P. Craven.*—A triangular guide attached to the cage forces apart two pulleys, of which one is fixed to a pivotted quadrant and the other to the frame. The teeth of the quadrant engage a pinion on the spindle of a drum to which is fastened a rope passing over the pulleys to a well door; as the cage passes, it first rocks the quadrant in one direction to raise the door, and then the quadrant, descending through its own weight, makes it resume its original position. A pivotted arm joined to the drum by a rope may be substituted for the quadrant.

9,331.—PROPORTIONAL DIVIDERS: *F. H. de Tray and T. R. Sledding.*—The legs fit into sockets in yokes and are adjustably locked by thumb-screws, pivotted segments, graduated at their edges, carry the yokes, and so engage as to allow only a relatively sliding movement; for rough adjustment is provided a spring catch that snaps into a notched rack to be moved, for finer adjustment, by a screw; the short legs, having pointers that work over scales, are slotted to slide over the pivot and are guided by screws clamped by nuts.

9,334-5.—MOULDING FACING TILES AND TILING CEILINGS, WALLS, &c.: *W. Hewitt (Godwin & Hewitt).*—Bevelled strips, forced below loose pieces by springs, form undercut recesses in the backs of the tiles, and carry the tiles with them when the die leaves the mould. In order to release the tiles, the strips are drawn against the force of the springs by means of a discharge plate whose projections pass through holes at the dies' back, the springs bearing against cross-ribs of the die-plate, and against pins that project from the strips and slide in grooves in the die. For tiling purposes the tile edges have semicircular recesses that engage with flanged studs projecting from strips which are carried on rabbetted slats fixed on the wall or ceiling; on occasion headed studs are screwed into the slats (which may be rectangular in section), joists, or woodwork, and slotted washers are slipped on to the studs to be turned in the tile grooves.

9,376.—PAVING AND FLOORING: *J. Mills.*—Trays are formed of a steel base with angle-iron sides and cast-iron corners rivetted on, or of old ships' plates with their edges turned, and are then fitted with concrete, wood, or granite blocks; eye-bolts are screwed into tapped holes in the corner pieces, in the absence of the corner filling-block, for the fixing of grappling chains that lift the tray into its place, or for removing it when the road is being repaired.

9,391.—SAFES AND STRONG-ROOMS: *E. C. Shankland.*—The end in view is to render it more difficult to fuse a hole through the wall with an electrical arc; the wall is made of two transversely-laid steel layers embedded between enclosing plates; in the space between the layers is filled a material having high electrical resistance, in which short rods of hardened tool steel, each completely insulated, are embedded; the inventor relies upon the impracticability of drilling a hole to reach the rods which shall be large enough to take both wires of the arc and the destroying tool also, so that two holes must be drilled for the wires—the probability being that any pair of holes will, by touching different rods, prevent a complete circuit from being formed; the lock is in the middle, behind the triple thickness.

9,438.—ATMOSPHERICAL GAS-BURNERS: *R. T. & J. G. Glover.*—For brazing, heating, and incandescent lighting purposes two inclined nozzles, with impinging flames, are devised; needle valves control the gas supply and the opening of the air-inlet is regulated by sleeves, the liners being made with a slightly less diameter, but expanding at their lower ends to prevent heat from passing to the tubes.

9,500.—WRENCHES: *J. E. England & C. J. Bousfield.*—The grip is effected by the stem's toothed head, and the pivotted bent arm which slides on the stem and is fixed to it by a pawl that engages ratchet teeth upon the stem; the pawl may be either formed in one piece with the link, or loosely pivotted to the link and backed by a shoulder upon it in order to relieve the strain from the pivot pin.

9,519.—METAL AND CEMENT PIPES: *Dufour Frères.*—In a cement matrix is embedded an iron-plate cylinder, having wire netting inside, and outside a set of rods bound together with rings secured by ties. The flanged ends of the cylinder reach beyond the cement, so that they may receive flanges made in any number of parts. The pipes are joined by means of the flanges, and the space between the cement parts can be filled.

9,660.—COVERS FOR INSPECTION OPENINGS: *D. W. Buchan.*—In the pipe's faucet is fixed a socket having an annular groove, into which dips the flange of a cover, which is held down by a bayonet-joint engagement with the socket. A pin or screw holds a second cover in position. In a variation, a third cover is employed, or the two covers described may be formed as one.

9,669-70.—TONGUEING AND GROOVING WOOD; CUTTING WOOD SHAVINGS: *A. A. Westman.*—To reduce friction and facilitate grinding, the sides of each cutting

tooth are inclined, and the back of the tooth behind the cutting edge is curved towards the centre to afford clearance; and that its face may be easily ground when the cutters are being sharpened, the cutter-disc is recessed or notched in front of each cutting edge, the tongueing cutter is similarly shaped. For cutting up long wood shavings, &c., the cutter-blades are bolted on to blocks mounted upon two shafts which three toothed pinions gear together, the edges of the blades being set obliquely that they may act scissor-wise with the fixed cutters; oblique "lists" guide the shavings as they move about the cutters which, when not at work, may be locked by a pin that passes through the shaft of the middle pinion.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 1.—By SEDGWICK, SON, & WEALL (at Rochester).

Cliffe, Kent.—Orchard and common field, 6 a. 2 r. 12 p., f.	£200
Frindsbury, Kent.—Enclosures of land, 10 a. 3 r. 37 p., f.	360
Orchard and meadow land, 1 a. 3 r. 3 p., f.	160

August 2.—By A. DOWELL (at Edinburgh).

Leith.—Breadalbane-st., Pattison's warehouses and stores, area 1 a. 3 r. 26 p.	25,000

August 3.—By W. R. NICHOLAS & Co. (at Newbury).

East Ilsley, Berks.—Enclosures of arable, 35 a. 2 r. 15 p., f.	190

By W. G. JAMES (at Haverfordwest).

Llanwnda, Pembroke.—The Farm of Talygare, 98 a. 2 r. 5 p., f.	1,000

August 8.—By FAREBROTHER, ELLIS, & Co. (at Kingston).

Kingston, Surrey.—King's-rd., thirty-two plots of building land, f.	3,275

By Messrs. BALLS (at Halstead).

Gestingthorpe, &c., Essex.—Little Chelmshoe House Farm, 61 a. 3 r. 38 p., f.	740

By WALLIS, RIDDETT, & Co. (on the estate).

St. Helen's, Isle of Wight.—Castle Cottage, f., e.r. 35*l.*	580
Two plots of building land, f.	320
1 to 4, Castle-villas, f., r. 82*l.*	1,230
St. Helen's-green, f.g.r. 6*l.*, reversion in 931 yrs.	165
South View and the Villa Stables, f.	600
Mill-rd., two plots of land, 3 a. 1 r. 18 p., f.	530

August 9.—By BARCHAM & SON (at Sheringham).

Bodham, &c., Norfolk.—A freehold and copyhold farm, 246 a. 1 r. 11 p.	4,500

By W. SALISBURY & HAMER (at Whalley).

Whalley, Lancs.—Brook House Farm, Lamb Row Farm, and the "Spread Eagle" p.-h., area 187 a. 0 r. 6 p., f.; also f.g. rents 7*l.* 14s. 2d., reversion in 983 yrs.	11,500

By HORNBY & CRANSWICK (at Driffield).

Wold Newton, Yorks.—A freehold farm, 160 acres	4,750

August 10.—By NEWBON, EDWARDS, & SHEPHARD.

Leytonstone.—3, Ashbridge-rd. u.t. 94½ yrs., g.r. 5*l.* 10s., r. 38*l.*	360
Hyde Park.—Cambridge-ter., i.g.r. 11*l.*, u.t. 30¾ yrs., g.r. nil	175

By F. PERKS.

Sydenham.—192, 194, and 196, Sydenham-rd., u.t. 62 yrs., g.r. 25*l.*, r. 115*l.*	775

By WRIFORD & DIXONS.

Wandsworth.—60, Fullerton-rd., f., r. 25*l.*	410

By ELLIOTT, ELLIS, & Co. (at Plymouth).

Tamerton Foliott, Devon.—Little Fancy and 8 a. 0 r. 19 p., f.	4,650

August 12.—By FRANKLIN & JONES (at Oxford).

Kidlington, Oxon.—The "Six Bells" Inn, with three cottages adjoining, f., r. 31*l.* 0s. 8d.	1,500
The "Red Lion" p.h., f., r. 18*l.*	2,700

By J. CARTER JONAS & SONS (at Cambridge).

Great Shelford, Cambs.—Various enclosures, 7 a. 2 r. 5 p., f.	680
Ashdon, Essex.—Three enclosures, 16 a. 0 r. 26 p., f.	300
Aldreth, Cambs.—Various enclosures, 38 a. 2 r. 19 p., f.	930

August 14.—By MOSS & JAMESON.

Maidenhead, Berks.—Holyport, Hazelbank, and 5½ a., f.	5,500

By ELLIS & SON (at Walton-on-the-Naze).

Walton-on-the-Naze, Essex.—Kirby-road, four plots of land, f.	435
Saville-st., two plots of land, f.	640
Esplanade, six plots of land, f.	1,355

By W. DEW & SON (at Barmouth).

Dyffryn, Merioneth.—Gornant Isaf House, and 21 a. 1 r. 22 p., f.	1,025
Castell Coch House, and 6 a. 2 r. 30 p., f.	400
Three building sites, 2 a. 0 r. 16 p., f.	180
2, Sea View Cottages, f.	120
Llanelltyd, Merioneth.—Caemabseifion Uchaf and Isaf Farms, 540 a. 1 r. 18 p., f.	2,200

By J. & A. BRAV (at Bexhill).

Bexhill, Sussex.—1, Reginald-rd., f., r. 50*l.*	850

August 15.—By BROAD & WILTSHIRE.

Pimlico.—53, Hanover-st., u.t. 44½ yrs., g.r. 7*l.*	310

By G. E. CURTIS & SHARP.

Stratford.—The Green, Chestnut Lodge, and 3 a., f.	2,850

By TOPLIS & HARDING.

Hackney.—97, Lansdowne-rd., u.t. 61 yrs., g.r. 7*l.*, e.r. 50*l.*	550

By W. H. HANSON (at Gainsborough).

Blyton, Lincs.—A freehold farm, 101 a. 0 r. 37 p.	3,000

By J. PLUMER CHAPMAN (at Lewes).

Laughton, Sussex.—A freehold cottage residence	400
A copyhold house, shop, and cottage	345

By G. B. HILLIARD & SON (at Billericay).

Billericay, Essex.—The Brickfield, 5 a. 1 r. 38 p., f.	850

August 16.—By E. W. RICHARDSON & SON.

Willesden.—Stonebridge Park, Denmark House, u.t. 70½ yrs., g.r. 12*l.* 10s., r. 60*l.*	490

By TOBIN & SONS.

Stepney.—113, Eastfield-st., f.	180

By VICTOR VAUGHAN.

Regent's Pk.—28, Little Albany-st., u.t. 23½ yrs., g.r. 4*l.* 4s.	£140
Stratford.—24, Crownfield-rd., f.	300

By BAKER & SONS (at St. Albans).

St. Albans, Herts.—London-rd., Cox's laboratory and factory, area half-an-acre, f.	1,920

By TABERNACLE & SON (at Horse Shoe Hotel).

City of London.—Milton-street, "Ye Olde Greyhound" p.-h., u.t. 42 yrs., r. 140*l.*, with goodwill	5,750

August 17.—By PRATT & MARSLAND.

Bermondsey.—2 to 10 (even), Trothy-rd., u.t. 41 yrs., g.r. 25*l.*	1,450
6 to 14 (even), Webster-rd., u.t. 47 yrs., g.r. 25*l.*	1,350
Rotherhithe.—8, 10, 16, 18, 24, 26, and 28, Raymouth-rd., u.t. 52 yrs., g.r. 25*l.*	2,230
53 to 63 (odd), Galley Wall-rd., u.t. 45 yrs., g.r. 24*l.*	1,210

By W. B. MASON.

Twickenham.—The "Eel Pie Island" Hotel, f.	3,200
Eel Pie Island, 21 plots of building land, f.	2,922
Eel Pie Island, a corner plot of building land, f.	1,250

By TURTLE & APPLETON.

Battersea.—26, 28, and 30, Cologne-rd., u.t. 79 yrs., g.r. 21*l.*	1,000
Streatham.—6, 7, and 8, Spencer Villas, f.	650
Marian-rd., &c., 12 plots of land, f.	445
Battersea.—78a, Harbut-rd., u.t. 79 yrs., g.r. 7*l.*, r. 35*l.*	375

August 18.—By JONES, LANG, & Co.

Acton.—Acacia-rd., Woodthorpe, and half-an-acre, f.	1,500
Acacia-rd., f.g. rents 20*l.*, reversion in 79 yrs.	600
Horn-la., f.g. rents 18*l.*, reversion in 71 yrs.	545

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.

PRICES CURRENT OF MATERIALS:

WOOD.*

Per Petersburg standard hundred.

	£ s. d.	£ s. d.
White Sea: first yellow deals	17 0 0	18 0 0
Second do.	13 5 0	14 15 0
Third do.	11 10 0	12 15 0
Battens, 40s., 30s., and 15s. respectively.		
Petersburg: first yellow deals	13 15 0	16 5 0
Second do.	10 15 0	12 5 0
Battens, 30s. and 20s. less respectively.		
Petersburg, white deals	9 15 0	11 15 0
Do. white battens	8 5 0	9 15 0
Riga, white deals	8 5 0	9 5 0
Swedish mixed yellow deals	13 5 0	16 15 0
Third do.	12 5 0	14 15 0
Fourth do.	10 15 0	11 15 0
Fifth do.	9 15 0	10 15 0
Battens, 30s., 20s., and 10s. less respectively.		
Whitewood, 10 to 20 per cent. less.		
Finnish unsorted yellow deals	9 15 0	10 5 0
Battens, 10s. and 5s. less respectively.		
Whitewood, 5 to 10 per cent. less.		
Norwegian second yellow battens	8 5 0	9 5 0
Third do.	7 15 0	8 15 0
Fourth do.	7 5 0	8 5 0
Whitewood, 10s. less.		
Danzig, Crown Deck deals, per 40 ft. 3 in.	0 15 0	1 5 0
Brack	0 12 0	1 0 0
St. Lawrence Pine deals, &c., per P.S.H.:		
1st, Bright and Dry, regular sizes	20 10 0	27 0 0
" " oddments	13 10 0	20 5 0
2nd " regular sizes	15 10 0	18 15 0
" " oddments	11 0 0	14 10 0
3rd " regular sizes	9 10 0	11 0 0
" " oddments	8 0 0	9 0 0
4th " regular sizes	7 15 0	8 10 0
" " oddments	7 0 0	7 15 0
St. Lawrence Spruce deals, &c.		
First, regular sizes	8 15 0	10 15 0
Second "	7 10 0	8 10 0
Third "	7 5 0	8 0 0
Fourth "	6 5 0	7 0 0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.		
New Brunswick Spruce deals, &c.	7 5 0	8 0 0
Oddments, battens, and fourths	6 10 0	7 10 0
United States pitch pine planks and boards	8 5 0	11 15 0
Prepared Boards, per square		
1¼ by 6½ and 7 in. 1st yellow	11 6	14 9
" " 2nd "	10 0	11 9
1 by 6½ and 7 in. 1st "	8 6	10 9
" " " white	8 0	8 9
" " 2nd yellow	8 0	9 9
" " " white	6 6	7 3
⅞ by 6½ & 7 in. 1st & 2nd yellow	7 3	8 0
" " " white	6 9	7 6
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)	6 3	8 9
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	5 3	7 6
⅝ by 6½ and 7 in. 1st yellow and white (ditto)	5 3	6 0
⅝ by 6½ and 7 in. 2nd yellow and white (ditto)	4 9	5 6
Narrower widths at 10 per cent. less.		

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT—*continued.*

	£ s. d.	£ s. d.
3rd quality at 15 per cent. less than 2nd.		
Danzig and Memel Fir Timber—per load		
Best middling	2 10 0	3 10 0
Good middling and Second	2 0 0	3 5 0
Common middling	1 10 0	2 10 0
Undersized	1 10 0	1 15 0
Swedish and Norwegian Balks	1 5 0	1 15 0
Baltic Oak Timber—		
Danzig and Stettin—Large	3 5 0	3 15 0
Small	2 0 0	2 5 0
Quebec Timber per load		
Yellow Pine	3 15 0	5 10 0
Oak	4 5 0	6 5 0
Elm	4 17 6	5 15 0
Ash	4 2 6	5 5 0
Birch	3 7 6	5 5 0
New Brunswick, &c., Birch	2 2 6	2 17 6
American Pitch Pine Timber	3 6 0	4 0 0
Wainscot, per log, 18 cubic ft.—		
Crown (Eng. & Dutch) } nominal	5 5 0	7 0 0
Brack } nominal	4 10 0	5 10 0
Lathwood, per cubic fathom—		
Petersburg	4 0 0	6 10 0
Riga and Danzig	4 10 0	5 10 0
Norway Poles, per ft. run	0 0 1	0 0 1½
Oak Staves, per mille full size pipe		
Memel, Crown	210 0 0	220 0 0
Brack	180 0 0	190 0 0
Danzig	165 0 0	175 0 0
Bosnia, single Barrel (nominal)	28 0 0	30 0 0
United States, Pipe	35 0 0	42 10 0
Hogshead, extra heavy and double extra	27 10 0	32 10 0
Indian Teake per load	11 15 0	16 15 0
British Guiana Greenheart	0 0 0	8 0 0
Mahogany, per foot superficial—		
Honduras, cargo average	0 0 4½	0 0 6
Nicaragua, do.	0 0 4½	0 0 5½
Tabasco, do.	0 0 4	0 0 6½
Mexican, do.	0 0 3½	0 0 4
Panama, do.	0 0 3	0 0 4
African, do.	0 0 3½	0 0 5
Cuba, do.	0 0 5½	0 0 7½
St. Domingo, do.	0 0 5	0 0 7
Do. Curls (good to prime)	0 0 9	0 1 3
Walnut, American (logs)	0 2 3	0 4 6
Do. do. (planks and boards)	0 2 0	0 7 6
Italian, per foot superficial	0 0 3	0 0 7½
Black Sea, per ton	6 0 0	12 0 0
Satin Walnut (logs) per foot cube	0 1 0	0 1 3
" (planks and boards)	0 2 0	0 2 9
Sequoia (Californian redwood), per foot cube	0 1 9	0 2 0
Whitewood, American (logs)	0 1 3	0 1 6
" " (planks and boards)	0 1 6	0 2 9
Quartered oak " " "	0 2 3	0 4 0
Kauri pine (logs)	0 1 9	0 2 0
" " (planks)	0 2 3	0 2 9
Jarrah (planks)	0 2 3	0 2 6
Lancewood spars each, fresh and large	0 5 0	0 8 0
Lancewood spars, ordinary to fair	0 4 0	0 5 0
Degame spars	0 8 0	0 10 6

METALS.

IRON—Pig, in Scotland ton	3 8 6	0 0 0
Bar, Welsh, in London	6 0 0	6 5 0
Do. do. at works in Wales	5 15 0	5 17 6
Do. Staffordshire, in London	6 5 0	7 10 0
COPPER—British cake and ingot	80 5 0	80 15 0
Best selected	80 15 0	81 5 0
Sheets, strong	85 0 0	86 0 0
Chili bars	76 0 0	0 0 0
YELLOW METAL lb.	6¾d.	7¼d.
LEAD—Pig		
Spanish ton	15 0 0	0 0 0
English Com. Brands	15 5 0	0 0 0
Sheet, English, 6 lbs. per sq. ft. and upwards	16 5 0	0 0 0
Pipe	16 15 0	0 0 0
ZINC—English sheet ton	28 0 0	0 0 0
Vieille Montagne	29 0 0	0 0 0
Spelter	23 5 0	24 0 0
TIN—Straits	143 0 0	0 0 0
Australian	143 5 0	143 10 0
English Ingots	146 10 0	147 10 0
Banca	0 0 0	0 0 0
Billiton	0 0 0	0 0 0

OILS.

Linseed ton	21 5 0	0 0 0
Cocoanut, Cochin	29 5 0	0 0 0
Do. Ceylon	25 15 0	0 0 0
Palm, Lagos	24 0 0	0 0 0
Rapeseed, English, pale	24 15 0	0 0 0
Do. Brown	23 5 0	0 0 0
Cottonseed ref.	17 15 0	18 15 0
Oleine	17 5 0	19 5 0
Lubricating U.S.	0 5 9	0 7 9
Do. Black	0 5 0	0 6 0
TAR—Stockholm barrel	1 6 6	0 0 0
Archangel	1 0 0	0 0 0
Turpentine	35 0 0	0 0 0

TO CORRESPONDENTS.

G. T. H. (Great Yarmouth). (If you send us your address, we will reply to your inquiry).—W. C. (Amounts of tenders should have been stated).—J. B. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
Sewerage and Water Supply	Hay (Brecknock) R.D.C.	25*l.*	Aug. 28
Plans for Schools	Northfleet Sch. Bd.	15*l.* 15s.	Sept. 4
Town Hall	Borough of Workington	40*l.*; 20*l.*; and 10*l.*	Sept. 15
Public Library	Dumfries and Maxwelltown T.C.	Not stated	do.
Bank, Norwich (Local Competition)	Directors of Norfolk & Norwich Savings Bank	50 gns.; 20 gns.; & 10 gns.	Sept. 16
Designs in Tunbridge Ware	Tunbridge Wells Tech Education Com.	3 gns.; 2 gns.; 1 guinea	Sept. 30
New Public Market	Bd. of Public Wks. for Island of New Providence, Bahamas, West Indies	40*l.* 10*l.* 5*l.*	Nov. 30.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Steel Girder Rails (2,000 tons), &c.	Bradford Corp.	J. H. Cox, Engr. Town Hall	Aug. 28
Granite Setts (5,000 tons)	do.	do.	do.
Road Works	Glenties (Donegal) R.D.C.	A. Hill, Board Room, Glenties	do.
Wood Paving Blocks	Bradford Corp.	J. H. Cox, City Surv. Town Hall	do.
Bridge Piers, &c. Dalston, Cumberland	Carlisle R.D.C.	G. Armstrong, Archt. 24, Bank-street, Carlisle	do.
Lodge, near Canterbury	Chartham P.C.	A. Bromley, Archt. Cathedral Precincts, Canterbury	do.
Police Station, Luton	Bedfordshire C.C.	County Surv. Shire Hall, Bedford	do.
Hotel, Wooda Bay, near Barnstaple	.....	G. U. Smyth-Richards, Surv. Barnstaple	do.
Paving, James-street	Devonport T.C.	J. F. Barns, Boro Surv. Town Hall	do.
Chapel Works, Illogan Downs, Cornwall	.....	S. Hill, Archt. Redruth	do.
Hydrant Works, Town Hall	Blackpool Corp.	Potts & Co. Archt. St. George's-rd. Bolton	do.
Sewering, Levelling, &c. 12 Streets	Sandal Magna U.D.C.	F. Massie, C.E. Tetley House, Wakefield	do.
Three Houses, Main-st. Tipperary	.....	W. H. Hill & Son, Archt. 25, South Mall, Cork	do.
Post Office, Fore-street, Okehampton, Devon	.....	J. A. Lucas, Surv. Okehampton	do.
Three Houses and Shop, Monkhill-lane, Pontefract	J. Robinson	C. Keyworth, Archt. Bank chmbrs. Pontefract	do.
Flagging, Kerbing, &c.	Cockermouth U.D.C.	J. Fearon, Council Offices	do.
Street Works, Cleveland-street	Kempston (Beds.) U.D.C.	L. Foster, Surv. Bedford-road, Kempston	do.
House, Bwlch, Brecon	.....	Down & Richards, Archt. Crickhowell	do.
Outbuildings, &c. Bolam, Durham	.....	T. Price, Bolam, Belsay, Newcastle-on-Tyne	do.
Factory, Fish Docks	Great Grimsby Ice Co.	W. Readman, Fish Docks rd. Grimsby	Aug. 27
Sprinkler Tower, Clayton-le-Moors	Enfield Spinning Co. Ltd.	H. H. Wilkinson, Albert Mill, Clayton-le-Moors	Aug. 28
Road Works, John-street	Harrogate Corp.	S. stead, Boro Surv. Town Hall	do.
Pipe Sewer, Torpoint, Devon	.....	S. W. Jenkin & Son, Liskeard	do.
Sewerage Works, Lime-grove, &c.	Denton (Lancs.) U.D.C	G. H. Newton, Surv. Town Hall	do.
New Municipal Buildings and Alterations of Public Hall	Borough of Godalming	Lanchester, Stewart, & Rickards, 1, Vernon-place, Bloomsbury-sq.	do.
Water Mains, &c.	East Ashford R.D.C.	Bailey-Denton & Co. Engr. 9, Bridge-st. S.W.	do.
Sewage Disposal Works, Westbury-on-Trym	Barton Regis R.D.C.	A. P. J. Cotterell, C.E. 7, Baldwin-st. Bristol	do.
New Board Schools and Swimming Bath	Chesterfield Sch. Bd.	Tittman & Jackson, Arcnt. 29, Knifesmith-gate, Chesterfield	do.
Road Works	Stranorlar (Ireland) R.D.C.	G. M'Laughlin, Council Offices	do.
Dynamos, Electric Mains, &c.	Perth Comms.	W. C. C. Hawtayne, Elec. Engr. 9, Queen-st.-pl. E.C.	do.
Extension of Electricity Works	Halifax County Boro Council	W. H. D. Horsfall, Archt. Silver-street, Halifax	do.
Schools, Aber, near Caerphilly	Eglwysilan Sch. Bd.	J. H. Phillips, Archt. St. John's-chmbrs. Cardiff	do.
Sewering, Flagging, &c. Sandringham-road	Waterloo (Lancs.) U.D.C.	F. S. Yates, C.E. Council Offices	do.
Water Pipe, &c. Pass of Leny	Callander (N.B.) Commissioners	A. Roberts, Callander	do.
Excavation Work and Flood Gates	Monmouth Corp.	B. H. Deakin, Town Hall, Monmouth	do.
Excavating Trenches	Brighton T.C.	F. J. Tidstone, Town Hall, Brighton	do.
Arc Lamp Posts, Brackets, &c.	West Hartlepool Corp.	Prof. A. B. W. Kennedy, 17, Victoria-st. S.W.	do.
House and Stabling, Keighley-road, Shipley, Yorks.		A. Sharp, Archt. Market-st. Bradford	do.
Alterations to Laundry	Stone (Staffs.) Union	J. J. Chapman, Archt. Tunley-st. Stone	do.
Sewage Works, Ashstead	Epsom R.D.C.	Beesley & Co. 11, Victoria-street, S.W.	Aug 29
Street Works	Stanley (Durham) U.D.C.	J. Routledge, Surv. Council Offices	do.
Paving, Scott Park-road	Burnley Corp.	Boro Surv. Town Hall	do.
Paving, Sandhurst-road, &c.	Bedford U.S.A.	T. S. Porter, Town Hall	do.
Street Works, Back Murray-street, &c.	Stanley (Durham) U.D.C.	J. Routledge, Surv. Council Offices	do.
Alterations to Old Pencil Mills, Braithwaite	.....	J. Howes, Archt. 2, 25, Curwen-st. Workington	do.
Heating and Foundation Works, Cross Flatts Park	Leeds Corp.	City Engr. Municipal-bldgs. Leeds	do.
Cast Iron Pipes and Laying	Beith (N.B.)	Warren & Stuart, 115, Wellington-st. Glasgow	do.
Trial Bore-hole, Meare, nr. Glastonbury	Wells R.D.C.	A. P. I. Cotterell, Engr. Bristol	do.
Painting Slaughter-houses, Lairs, &c	Burnley Corp.	W. T. Fullalove, Town Hall	do.
Public Convenience, Cart Score, Belle Vue Park	Lowestoft T.C.	G. H. Hamby, Boro Engr. Lowestoft	do.
Excavation Works, near Tomintoul	.....	John Anderson, Tomintoul, Elgin	do.
Bridge, White's Farm-road, Great Bursted	Billericay R.D.C.	C. E. Lewis, New-road, Brentwood	do.
Sewerage Works, Moorsholm	Skelton-in-Cleveland U.D.C.	W. P. Robinson, C.E. Skelton	Aug. 30
Sanatorium	Malvern U.D.C.	W. Lambert, Council Offices	do.
Service Reservoir, &c.	Westbury (Wilts), &c. R.D.C.	W. H. Stanley, C.E. Trowbridge	do.
Sewage Purification Works	Morley Corp.	W. E. Putman, C.E. Town Hall	do.
Underground Convenience, Market-place, Enfield Town	Enfield U.D.C	R. Collins, Surv. Council Offices	do.
Sewerage Works, John-street	Hebburn U.D.C.	J. B. Benton, Surv. Council Offices	do.
Repairs, &c. to Chimney Stacks, Fulham-road, West Brompton	St. George's Union	E. T. Hall, Archt. 57, Moorgate-street, E.C.	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Bridge Works, Halesowner	Worcestershire C.C.	J. H. Garrett, Road Surv Shirehall, Worcester	Aug. 30
Blue Brick Paving, &c.	do.	do.	do.
Workshop Machines	East Indian Ry. Co.	A. P. Dunstan, Secretary, Nicholas-lane, E.C.	do.
Road Works, Osborne-rd. &c.	Erdington U.D.C.	H. H. Bumphries, Surv. Public Hall	do.
Wrought Iron and Steel Tanks, Charlestown-road	Halifax Corp.	T. Holgate, E.E. Mulcture-hall-road, Halifax	do.
Electric Lighting Works, Kirkstall-road	Leeds Corp	T. Hewson, C.E. Municipal-buildings	do.
Rebuilding Grenadier Inn, Heath End, Farnham	Army & Navy Co-op. Breweries	Friend & Lloyd, Archt. Aldershot	do.
Alterations to Premises, King-street, Whitehaven	.....	J. S Moffatt, Archt. 53, Church-st. Whitehaven	do.
Stables, Sheds, &c. Overton Farm near Wroughton, Wilts.	.....	R. J. Beswick, Archt. 9, Regent-st. Swindon	do.
Laundry Buildings, &c. Mount Gould-road	Plymouth Corp.	G. D. Bellamy, C.E. Courtenay-st. Plymouth	Aug. 31
Workmen's Dwellings	Sunderland Corp.	Boro Surv. Town Hall Sunderland	do.
Electric Batteries, &c.	Battersea Vestry	Prof. A. B. W. Kennedy, 17, Victoria-st. S.W.	do.
Sewerage Works, Capelulo	Penmaenmawr, U.D.C.	E. Worrall, Surv. Council Offices	do.
Sunday School, &c. Woodsley-road Leeds	.....	G. F. Danby, Archt. 10, Park-row, Leeds	do.
Warehouse, &c. Poland-street	Manchester Corp.	J. Swarbrick, Archt. 33, Brazennose-st Manchester	do.
House	G. H. Chapman	Hatfield & Hawes, Archts 152, High-st. Putney	do.
School and Classrooms, Woodsley-rd Leeds	.....	G. F. Danby, Archt. 10, Park-row, Leeds	do.
Ten Pair Villas, Phillips av. Linthorp	.....	A. F. Newsome, Archt. Albert-rd. Middlesbro.	do.
Two Villas, Phillipsville Estate Linthorpe	.....	do.	do.
Road Works, Laburnum-grove, &c.	Litheland U.D.C.	W. B. Garton, C.E. 25, Sefton-rd. Litherland, Lancs.	do.
Enlarging Presbyterian Church Monaghan	.....	F. Dunwoody, J.P. Monaghan	do.
Shops, Devizes-rd. Swindon	Chandler Bros.	W. H. Read, Archt. Corn Exchange, Swindon	do.
Slating, &c. Fraser-st. Workington	.....	T. Johnston, Corporation-rd. Workington	do.
Additions to Farmsteading, Milton Brodie Estate	.....	C. C. Doig, Archt. Elgin	do.
Houses, Seafield-crescent, Elgin	.....	Sutherland & Jamieson, Archts. Elgin	do.
Eight Houses, South-st. Bridlington Quay	E. Mainprize	J. Earnshaw, Archt. Bridlington Quay	do.
Stone Buildings and Five Houses, Liversedge	Heckmondwike Indus. Co-op. Soc.	Castle & Son, Archt. Bank bldgs. Heckmondwike	do.
Sewerage Works, Lower Brook-st.	Basingstoke T.C.	G. Fitton, Boro Surv. Town Hall	do.
Additions to Houses in Queen-street, Cardiff	G. A. Sercombe & Co.	James & Morgan, Archts. Charles-st. Chmbrs. Cardiff	do.
Additions to Alverthorpe Mills	.....	C. S. Nelson, Archt. 15, Park-row, Leeds	do.
Thirty-three Houses, Bradford Moor	Bradford Prov. Indus. Soc.	Rycroft & Firth, Archt. Manchester-rd. Bradford	do.
New Office, Broad-street, Bristol	Corporation of Bristol	T. H. Yabbicom, 63, Queen-sq. Bristol	Sept. 1
Academy	Irvine (N.B.) Sch. Bd.	J. Armour, Junr. Archt. Irvine	do.
Rifle Butt Buildings, &c. Rossall	.....	T. E. Topping, 7a, Central Beach, Blackpool	do.
Additions to Premises, Victoria-st.	St. Alban's Corp.	A. H. Debenham, Town Hall, St. Albans	do.
Reservoir (17,000,000 gallons)	Carmarthen Corp.	Boro Surv. Town Hall	Sept. 2
Sanitary Conveniences	Windsor T.C.	Boro Surv. Helena-road, Windsor	do.
Road Works, Canal-st. and Fryer-st.	Wolverhampton Corp.	J. W. Bradley, Boro. Engr Town Hall	do.
Two Houses, Park-rd. Loughborough	J. Bennett	A. E. King, Archt. Baxtergate, Loughborough	do.
House at Gasworks, Meadow lane	Leeds Corp.	R. H. Townsley, Municipal Buildings, Leeds	do.
Widening Dock Entrance, Spencer Dock	Belfast Harbour Commissioners	G. F. L. Giles, Harbour Engr. Belfast	Sept. 4
New Asylum	East Sussex Visiting Committee	G. T. Hine, 35, Parliament-street, S.W.	do.
Sewering of the Village of Sonning	Wokingham R.D.	R. W. Hamilton, 56, Hamilton-rd. Reading	do.
Sewerage Works, Cobb	Lyme Regis T.C.	Town Clerk, Lyme Regis	do.
Technical Institute	Padiham U.D.C.	H. Ross, Archt. Cannon-street, Accrington	do.
Granite and Slag	Wellingborough U.D.C.	J. T. Parker, 29, Church-st. Wellingborough	do.
Setts	Belfast Harbour Comrs.	G. F. L. Giles, Engr. Harbour Offices	do.
Tenements, Main-st. Camelon	Falkirk Heritable Property Co.	J. P. Goodair, Archt. Newmarket-st. Falkirk	do.
Granite and Slag	Wellingborough U.D.C.	J. T. Parker, 29, Church-st Wellingborough	do.
*Repairs to Entrance of Graving Dock at the Camber, Portsmouth	Boro. of Portsmouth	Boro. Engr.'s Office, Town Hall, Portsmouth	Sept. 5
Block of Schools at Chase Side, Enfield	Enfield Sch. Bd.	G. E. T. Laurence, 181, Queen Victoria-st, E.C.	do.
New Wesleyan Church	.....	Gordon, Lowther, & Gunton, Finsbury House, Blomfield-street, E.C.	Sept. 6
Sewerage Works, &c. Egmont-road	Sutton (Surrey) U.D.C.	C. C. Smith, Surv. Council Offices	do.
Steel rails, &c. for Tramways	Waterloo (Lancs.) U.D.C.	F. S. Yates, C.E. Town Hall, Waterloo	do.
Platform Coverings, Ealing Station	G. W. Ry. Co.	G. K. Mills, Sec. Paddington Station, W.	do.
Eleven Houses, Cwmaman, Aberdare	.....	J. L. Smith, Archt. Aberdare	do.
*Five Blocks of Buildings	County Borough of Devonport	The Borough Surv. 30, Kerst. Devonport	Sept. 7
Coastguard Station, Ballycrovane, Co. Cork	.....	H. Williams, Office of Public Works, Dublin	do.
Boundary Wall, &c. Roundhay Park	Leeds Corp.	City Engr. Municipal Buildings	do.
Public School, Comely Bank	Edinburgh Sch. Bd.	R. Wilson, Archt. 3, Queen st. Edinburgh	do.
Levelling, &c. Manchester-rd. & others	Reading S.A.	J. Bowen, Boro. Engr. Town Hall	do.
Post Office, Darwen, Lancs.	.....	J. B. Thornley, Archt. Darwen	Sept. 8
Coastguard Buildings, Cromarty, N.B	Admiralty	Director of Works, 21, Northumberland-av. W.C.	do.
Intermediate School, Rhyl	.....	J. R. Jones, 4, Brighton-road, Rhyl	Sept. 9
Electric Light and Traction Plant	West Ham U.D.C.	W. C. Ullmann, Elec. Engr. White Post-lane, East Ham	do.
Tramway Rails	East Ham U.D.C.	do.	do.
Electric Lighting and Traction Plant	do.	do.	do.
River Bridge, Walton-le-Dale	Lanca. C.C.	W. H. Radford, Engr. County Offices, Preston	Sept. 11
Water Works, Fairlie	Ayrshire C.C.	P. C. Hart, C.E. 32, John Finnie-st. Kilmarnock	do.
Asylum Superstructure	Croydon Corp	Boro Engr. Town Hall	Sept. 12
*Office and Lavatory Accommodation	Poplar and Stepney Sick Asylum	J. & S. F. Clarkson, 136, High-st. Poplar	do.
*Supply of Barges and Removal of Slop, &c.	St. Mary, Islington, Vestry	At Vestry Depot, Liverpool-rd. N.	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* —. *Contracts, pp.* iv. vi. viii. x. & xix. *Public Appointments, pp.* xvi. & xix.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Dynamos	Hackney Vestry	R. Hammond, C.E. 64, Victoria-st. S.W.	Sept. 12
Surveyor's Materials	Croydon R.D.C.	J. Wilson, Town Hall	Sept. 13
*Alteration to Town Hall	Bermondsey Vestry	The Surv. Town Hall Bermondsey	do.
Buildings at Sewage Disposal Works	Stalybridge, &c. Sewerage Bd.	Newton, Soo, & Bayley, 17, Cooper-st. Manchester	do.
*Distribution Works	Corp. of Birmingham	Jas. Mansergh, 5, Victoria-street, Westminster	Sept. 14
Steam Pumps, &c.	Leyton U.D.C.	F. H. Lewis, Engr. Cathall-rd. Leytonstone	do.
Block of Schools	Enfield School Board	G. E. L. Laurence, 181, Queen Victoria-st. E.C.	Sept. 15
*Repairing High-st, &c.	Barnet U.D.C.	W. H. Mansbridge, 40, High-st. Barnet.	Sept. 16
Sewering, Levelling, &c. Upper Newborough-st. and others	York Corp.	A. Creer, Engr. Guildhall, York	Sept. 18
*Structural Alterations, Woodfield House	Paddington Gdns.	F. J. Smith, Parliament Mansions, Victoria-st. S.W.	Sept. 27
Cottage Hospital, Hallwill, Devon	.....	C. F. A. Voysey, Archt. 6, Carlton-hill, N.W.	Sept. 30
*Underground Urinal, Blackheath	L.C.C.	Archt.'s Dept. Spring-gardens, S.W.	Oct. 3
Schools, Newport, Mon.	.....	F. R. Kempson, Archt. 16, High-st. Cardiff	No date
Kentish Ragstone Pitching (7,000 super. yds.) Southend-on-Sea	.....	A. Penney & Co. 107, Fenchurch-street, E.C.	do.
Additions to Workhouse, Beech-av, Nottingham	.....	A. H. Goodall, Archt. 14, Market-street, Nottingham	do.
Chapel and Schools, Barwell, Leicester	.....	A. E. Sawday, Archt. 4, Market-street, Leicester	do.
Alterations to Infirmary, Leeds	.....	W. A. Hobson, Archt. 82, Albion-street, Leeds	do.
Painting 14 Houses and 4 Shops, Market-st. Facit, Lancs.	.....	A. Stott, 15, Market-st. Leavengreave	do.
Channelling Works, Baliffe Bridge Hill	Hipperholme (Yorks) U.D.C.	J. Sykes, Surv. Council Offices, Whitehall, Hipperholme	do.
Offices and Warehouse, Watford	Benskin's Watford Brewery, Ltd.	C. P. Ayres, Archt. 14a, High-street, Watford	do.
Wesleyan Church Hall, Fratton-road, Portsmouth	.....	J. J. Green, Archt. South John-street, Liverpool	do.
Builder's Work at Infirmary, Bancroft-road	Mile End Old Town Union Guardians	W. Thacker, Guardians Offices, Mile End-rd. E.	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Slating (1,600 sq. yds.) Docking Mills, Batley	.....	M. Lobley & Co. Docking Mills, Batley	No date
Rebuilding Black Bull Inn, Market-pl. Dewsbury	J. Tetley & Son	F. W. Ridgway, Archt.	do.
Schools Restoration	Dewsbury Sch. Bd.	Boro Chmbrs. Dewsbury do.	do.
Electrical Fittings, Masonic Hall, Blackpool	.....	T. Sankey, 93, Adelaide-street, Blackpool	do.
40 Houses, Usworth, Co. Durham	.....	Little & Browne, Archt. Mosley-st. Newcastle	do.
Sinking Two Shafts, Seaham Harbour, Durham	.....	Secretary, Colliery Offices, Seaham Harbour	do.
Five Houses, &c. Bradford	.....	Jas. Young & Co. Archt. 62, Market-st. Bradford	do.
Rebuilding Premises, 29, High-street, Chepstow	C. Curtis	W. Robinson, Archt. King-st. Hereford	do.
Extension of Business Premises, East Kirkby, Notts.	.....	L. Bright, Archt. 9, St. Peter's Church-walk, Nottingham	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Temporary Assistant	Surbiton U.D.C.	3 gns. per week	At once
Drainage Inspector	Plumstead Vestry	3l. 3s. per week	Aug. 26
Draughtsman	do.	2l. 10s. per week	do.
Steam Roller Driver	do.	37s. per week and allowance	do.
Clerk	Wandsworth Board of Works	30s. per week, rising to 2l.	Aug. 28
Road Foreman	Twickenham U.D.C.	2l. 10s. per week	do.
Superintendent of Work's Dept.	Vestry of St. Mary, Battersea	260l. rising to 300l. per annum	Aug. 30
*Two Building Inspectors	Halifax County Boro.	100l. per annum each	Sept. 4
*Chief Architectural Assistant	City of Bradford	200l. per annum	Sept. 5
*Assistant	do.	150l. per annum	do.
*Clerk of Works	do.	120l. per annum	do.
*General Foreman	Bermondsey Vestry	3l. per week	Sept. 6
Sanitary Inspector	Camberwell Vestry	117l.	do.

Those marked with an asterisk (*) are advertised in this Number. *Competitions, p.* —. *Contracts, pp.* iv. vi. viii. x. & xix. *Public Appointments, pp.* xvi. & xix.

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under £100, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERTILLERY (Mon.).—For additions, &c., to school, for the Aberystruth School Board. Mr. R. L. Roberts, architect, Victoria-chambers, Abercarn. Quantities by architect:—

Wm. Smith	£2,000 0 0	Wm. Phillips	£1,550 0 0
D. Lewis	1,975 0 0	J. Jenkins, Newport*	1,525 0 0
A. P. Williams	1,877 16 0		
Gaen Bros.	1,663 3 5		

ALDERSHOT.—For various repairs to the "Builders' Arms," Aldershot, for Messrs. Lascelles, Tickner, & Co., Limited. Mr. Wm. G. Jones, architect, Broadway, Woking:—

Martin Wells & Co.	£125 0	J. Hughes, Aldershot*	£89 17
W. Garland	109 0		

BADSHOT LEA.—For various repairs to the "Crown Inn," Badshot Lea, near Farnham, Surrey, for Messrs. Lascelles, Tickner, & Co., Limited. Mr. Wm. G. Jones, architect, Broadway, Woking:—

Martin Wells & Co.	£150	J. J. Robins, Farnham*	£105
W. Garland	124		

BISHOP AUCKLAND.—For the erection of farm buildings, Windlestone Farm. Mr. F. H. Livesay, architect, Newgate-street, Bishop Auckland:—

Institute at Ruskyford.

Masonry, Slating, Plastering.—Thos. Atkinson, Coundon* £104 3 0

Joinery, Painting.—L. M. Dennis, Shildon* 64 5 0

Cow-house at Windlestone.

John Moore, Shildon* 69 0 0

Alterations to Windlestone Farm.

Masonry, Slating, Plastering.—T. Atkinson, Coundon* 56 0 8

Joinery, Painting.—Hope & Sons, Coundon* 33 6 0

BRIGHTON.—For the erection of twenty-eight artisans' dwellings, St. Helen's-road, for the Town Council. Mr. F. J. C. May, C.E., Town Hall, Brighton:—

Hallett & Duke	£7,594 0	Sattin & Evershed, Freshfield-road, Brighton*	£7,195 0
Hother & Co.	7,462 14		

BRISTOL.—For the erection of four houses, Kingswood. Mr. T. J. Moss-Flower, C.E., Scottish-buildings, Baldwin-street, Bristol:—

S. Williams	£765 12	Willis & Willmott, Hanham, near Bristol*	£638 10
J. Davis	745 0		

BYFLEET.—For the erection of a detached house at Byfleet, Surrey, for Mrs. Alice Charles. Mr. Wm. G. Jones, architect, Broadway, Woking:—

Greenfield	£1,128	C. Horsell, Weybridge*	£980
W. B. Young	1,085		

CHERTSEY.—For various repairs, &c., to the "Coach and Horses," Chertsey, Surrey, for Messrs. Lascelles, Tickner, & Co., Limited. Mr. W. G. Jones, architect, Broadway, Woking:—

J. Martin	£215	H. Plowman, Addlestone*	£198
G. Wells	210		

CARDIFF.—For the erection of mission hall, Cathays, for the Presbyterian Forward Movement. Messrs. Habershon, Fawckner, & Groves, architects, Pearl-street, Cardiff:—

F. Williams	£3,400 0 0	G. Hallett	£3,085 4 0
Shepton & Son	3,235 0 0	G. Griffiths	3,030 0 0
Beer & Sons	3,228 0 0	T. Evans	2,994 18 2
H. Gibbon	3,200 0 0	D. Thomas	2,979 0 0
Price Bros.	3,165 0 0	Handford & Elsworthy*	2,930 0 0
Evans & Bros.	3,140 19 2		

[All of Cardiff.]

ECCLES (Lancs).—For sewering, paving, &c., Atherton-street, and others, for the Corporation:—

Clifton-avenue.

W. A. Stamp, Urmston £144 9 0

Cook-street.

W. A. Stamp, Urmston £197 13 2

Atherton-street.

W. A. Stamp, Urmston £125 14 7

Somerville-street.

W. A. Stamp, Urmston £425 2 9

Scotta-road.

Johnson Bros. & Smith, Patricroft £46 1 2½

FRIMLEY.—For repairs to the "Rose and Thistle," Frimley Green, Surrey, for Messrs. Lascelles, Tickner, & Co., Limited. Mr. W. G. Jones, architect, Broadway, Woking:—

E. Kemp	£127	G. Finch, Frimley*	£104

GRIMSBY.—For laying pipe-sewer, Welholme-road, for the Urban Sanitary Authority. Mr. M. Petree, C.E., Town Hall-square, Grimsby:—

Chas. Simons	£199 15 9	Hewins & Goodhand, Grimsby*	£187 18 0

HARROGATE.—For paving, &c., Dragon-parade and other roads, for the Corporation. Mr. S. Stead, Borough Surveyor, Municipal Offices, Harrogate:—

John Dunn, 15, Beresford-terrace, Harrogate £3,466 14

HASTINGS.—For the erection of boundary walls, &c., St. Helens, for the Corporation. Mr. P. H. Palmer, C.E., Town Hall, Hastings:—

G. Barton, 8, Perth-road, St. Leonards* £425

ISLEWORTH.—For making up, kerbing, &c., Worple-road, Isleworth, for the Heston and Isleworth Urban District Council. Mr. W. A. Davies, C.E., Town Hall, Hounslow:—

Nowell & Co.	£1,931 0 0	Ball	£1,543 7 1
Chapman	1,624 0 0	Mowlem & Co., Westminster*	1,466 0 0
Lawrence & Thacker	1,622 19 6		

ISLEWORTH.—For the supply of Norwegian granite kerbing and channelling, &c., for the Heston and Isleworth Urban District Council. Mr. W. A. Davies, C.E., Town Hall, Hounslow:—

Griffiths	£18,643 6 6	Sommerfeld	£16,199 14 0
Hobman & Co.	17,991 18 0	Walker & Co.	15,897 14 6
Nowell & Co.	17,898 17 0	Ball	15,235 17 3
Lawrence & Thacker	17,302 7 6	Mowlem & Co., Westminster*	13,871 0 0

LISNASKEA (co. Fermanagh).—For the erection of five cottages for the Rural District Council:—

John Bloomfield, jun., Brookehoro*	£666 15
Patrick O'Neill‡	536 16
James Cox§	394 0

‡ For four cottages. § For three cottages.

KEIGHLEY.—For the erection of a foundry, Greengate. Mr. John Haggas, architect, North-street, Keighley:—

Masonry.—Slater & Waddington, Ingrow, Keighley*
Joinery.—Timothy Hird, King-street, Keighley*
Slating.—Wm. Thornton, Bingley*
Plumbing.—Wm. Lambert, Haworth*
Ironfounding.—John Barrell, Crosshills*
Patent Glazing.—Heywood & Co., Huddersfield*
} £1,173

LONDON.—For the erection of two shops at Trafalgar-road, Greenwich, S.E., for Mr. Gordon. Mr. Alfred Roberts, architect, 18, Nelson-street, Greenwich, S.E.:—

Henry Bridel	£1,475	Jones & Groves*	£1,388
William Mills	1,439		

LONDON.—For pulling down and rebuilding premises, Nos. 5 and 6, Candover-street, W., exclusive of sanitary and drainage work. Messrs. Clark & Hutchinson and Percy A. Boulting, joint architects, 28, John-street, Bedford-row, W.C.:—

Smith & Co.	£3,464	Burman & Sons	£3,169
Patman & Fotheringham	3,452	Anley & Son	3,139
Holloway Bros.	3,190	A. A. Webber*	2,997

LONDON.—For alterations and fittings to premises, Trafalgar-road, East Greenwich, for the London and Provincial Bank, Ltd. Mr. Alfred Roberts, architect, 18, Nelson-street, Greenwich, S.E.:—

Jones & Groves* £247

LONDON.—For coal order office, West Hampstead, for Messrs. Herbert Clarke, Ltd. Messrs. Potts, Son, and Hennings, architects:—

Sumner & Co.	£439	Mattock Bros.	£359
E. Green	386	Lapthorne & Co.*	354

MIDDLESBROUGH.—For the erection of electricity works, for the Corporation. Mr. R. Hammond, C.E., 64, Victoria-street, S.W.:—

Buildings.

Cook, Stockton-on-Tees* £10,280

Piling and Foundations.

Ridley & Sons, Middlesbrough* 3,019

Total £13,299

PERTH.—For the erection of gasworks, Friarton, for the Perth Gas Commissioners. Mr. A. Gillespie, engineer, 34, St. Enoch-square, Glasgow. Quantities by Mr. Wm. Campbell, 32, North Methuen-street, Perth:—

Section I.
Excavating and Brickwork.—Thos. P. Jamieson, Baillieston
Section II.
Carpentry and Joinery.—Wm. McQuibban, Perth
Section III.
Slating.—Brand & Son, Arbroath
Section IV.
Plumbing.—James McLeish, Perth
Section V.
Plastering.—Alex. McRitchie, Dundee
Sections VI. and VII.
Painting and Glazing.—Douglas & Son, Perth
} On a schedule of prices.

PONTEFRACT.—For alterations to shop and house, Ropergate, for Mr. Stuart Lowden. Messrs. Garside & Pennington, architects and surveyors, Pontefract:—

Walker & Ward, Mill Hill, Pontefract* £316 5 6

[*See also next page.*

PONTEFRACT.—For the erection of two shops, North Featherstone, near Pontefract, for Mr. W. Jowitt. Messrs. Garside & Pennington, architects and surveyors, Pontefract, Castleford, and Selby :—

Bricklaying.—Grudill, South Gate, Pontefract*	£117	12	9
Slating.—Stuart & Son, Jubilee-place*	20	10	0
Plumbing.—Thos. Leng, Ropergate*	20	5	6
Plastering.—J. Shaw, Ropergate*	11	2	6
Painting.—Thrall, Horsefair*	4	0	0

[Joiner's work not included in contract].

PURSTON.—For house and shop to be erected in Purston, near Pontefract, for Mr. Fred Williams. Messrs. Garside & Pennington, architects and surveyors, Pontefract :—

Bricklaying.—A. Taylor, Pontefract*	£140	0	0
Joinery.—Thos. Ward, Pontefract*	70	0	0
Plumbing.—H. Foster, Pontefract*	15	8	0
Slating.—G. Spurr, Pontefract*	17	15	0
Plastering.—J. W. Senior, Pontefract*	10	12	6
Painting.—T. Burton & Son, Pontefract*	4	3	0

RIPON.—For the execution of sewerage works, Ure Bank, for the Rural District Council. Mr. H. A. Johnson, M.Inst.C.E., Bradford :—
F. W. Simpson, Burton Leonard, Leeds £160 10 6

ROBIN HOOD'S BAY (Yorks).—For additions, &c., to police station. Mr. Walker Stead, C.E., County Surveyor, Northallerton :—

Langdale & Sons	£263	0	0
J. Gladstone	222	10	0
Atkinson & Co.	207	9	8
R. P. Brotton, Bilsdale, Middlesbro'*	£197	10	

ROTHERHAM.—For the erection of bakehouse, Northfolk-street, for the Masborough, &c., Co-operative Society. Mr. J. E. Knight, architect, 33, College-street, Rotherham :—

G. Pugh	£305		
Robert Snell	287		
Richard Snell	282		
Chadwick & Co.	254		
J. Earnshaw	£229		
J. Cooper, Rawmarsh-road, Rotherham*	220		

SHEFFIELD.—For making a road, Crookes. (First Contract). Mr. J. P. Earle, architect, Norfolk Chambers, Norfolk-row, Sheffield :—

F. Eyre	£388
J. E. Nadin, Sheffield*	362

STOCKLEY HEUGH (Durham).—For the erection of eight cottages, for Mr. W. Lishman. Mr. H. T. Gradon, architect, 22, Market-place, Durham :—

C. Groves	£1,521	1	4
M. R. Draper	1,400	0	0
G. T. Manners	1,338	0	0
T. Walton	1,308	14	6
T. Coates	£1,252	9	3
W. Lodge, Pity Me*	1,240	5	0

SUNDERLAND.—Heating to new technical college. Messrs. Potts, Son, and Hennings, architects :—

Vaux & Sons	£600		
Emley & Sons	575		
Matthews & Yates	561		
Dargue, Griffiths & Co.	£471		
Russell & Co., London*	450		

WOKING.—For the erection of shop and stabling, Guildford-road, Woking, Surrey, for Messrs. Lascelles, Tickner, & Co., Limited. Mr. Wm. G. Jones, architect, Broadway, Woking. Quantities by Mr. John Scott, surveyor, 23, Bedford-row, W.C. :—

Ingram & Son	£2,031		
A. A. Gale	1,957		
J. Whitburn	1,923		
G. Hooker	£1,885		
Harris & Son, Woking*	1,847		

WOKING.—For the erection of a steam laundry at Maybury-road, Woking, Surrey, for the Godalming Sanitary Steam Laundry Company, Limited. Mr. Wm. G. Jones, architect, Broadway, Woking. Quantities by Mr. John Scott, surveyor, 23, Bedford-row, W.C. :—

A. A. Gale	£12,090		
Higlett & Hammond	11,073		
F. Milton	10,475		
Gregory & Co.	10,200		
Martin Wells & Co.	£9,800		
Mitchell Bros.	9,570		
Harris & Son, Woking*	9,350		

WOKING.—For alterations to Goldsworth Hall, Woking, Surrey, for Mr. S. C. Knight. Mr. Wm. G. Jones, architect, Broadway, Woking :—

Ingram & Sons	£299		
J. Whitburn	297		
G. Hooker	285		
Harris & Son, Woking*	£273		

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder," by *Friday Morning's Post.*

The Surveyors' Districts Map
— OF THE —
County of London

(Supplement to the NEW YEAR'S NUMBER), can be
MOUNTED ON CLOTH,
If sent to the Publishing Office, at the following PREPAID rates, viz. :—

ON STRAINER (Varnished)	5/-
ON ROLLERS do.	3/6
FOLDED, in Case (Unvarnished)	2/6

N.B.—A remittance MUST accompany every Map sent in for mounting.

The NEW YEAR'S NUMBER is OUT OF PRINT, but
REPRINTS OF THE MAP ARE NOW READY,
Price One Shilling,
which purchasers can have mounted at above-mentioned prices.

Office :—46, CATHERINE STREET, LONDON, W.C.

W. H. Lascelles & Co.,
121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY,
LASCELLES' CONCRETE
Architects' Designs are carried out with the greatest care.
CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,
Bank, Office, & Shop Fittings.
CHURCH BENCHES & PULPITS.
ESTIMATES GIVEN ON APPLICATION.

C. B. N. SNEWIN
MAHOGANY, WAINSCOT, WALNUT,
TEAK, VENEER, and TIMBER MERCHANT,
Nos. 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, & 17, BACK HILL, HATTON GARDEN, and 29, RAY STREET, FARRINGDON ROAD, E.C.
THE LARGEST STOCK OF ALL KINDS OF WOODS IN EVERY THICKNESS, DRY, AND FIT FOR IMMEDIATE USE.
Telephone, No. 374 Holborn. Tele. Address "SNEWIN: London."

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF
BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(incorporating The Ham Hill Stone Co. and C. Trask & Son, The Doulting Stone Co.)
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

SPRAGUE & CO., Ltd.,
LITHOGRAPHERS AND PRINTERS.
Estate Plans and Particulars of Sale promptly executed.
4 & 5, East Harding-st., Fetter-lane, E.C. [ADVT.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.
METCHIM & SON { 8, PRINCES STREET, ST. GEORGE ST. WESTMINSTER
"QUANTITY SURVEYORS' DIARY AND TABLES." For 1899, price 6d. post 7d. In leather 1/- Post 1/1 [ADVT.

Ernest Mathews & Co.
61, St. Mary Axe, E.C.
SLATES, SLABWORK,
Enamelled Slate,
Marble,
Permanent Green Slates.
WORKS:
Bow, London, E. and Aberllefenny, North Wales.
BRANCH HOUSE:
37, Victoria-street, Bristol.

PILKINGTON & CO
(ESTABLISHED 1838),
MONUMENT CHAMBERS,
KING WILLIAM STREET, LONDON, E.C.
Telephone No., 2751 Avenue
Registered Trade Mark,
Poloncean Asphalte.
PATENT ASPHALTE and FELT ROOFING.
ACID-RESISTING ASPHALTE.
WHITE SILICA PAVING.
SEYSSEL ASPHALTE.

SZERELMEY STONE LIQUID.
The result of experience and research extending over MORE THAN HALF-A-CENTURY!
THE ONLY RELIABLE REMEDY FOR DAMP WALLS AND STONE DECAY.
It WATERPROOFS and PRESERVES
BRICK, STONE, CEMENT, STUCCO, PLASTER,
And every description of Building Material.
IT HAS STOOD THE TEST OF TIME!
N. C. SZERELMEY & CO., Szerelmey Works, Rotherhithe New-rd., S.E.

PORTLAND CEMENT

ROMAN, MEDINA, PARIAN, KEENE'S, PLASTER and WHITING,

Manufactured by

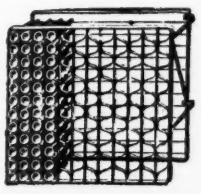
FRANCIS & COMPANY, LIMITED.

The Old Nine Elms Brand, Established 1810. Prize Medals—London, 1851; Philadelphia, 1876; Paris, 1878; Calcutta, 1883; London, 1884; Gold Medal, Paris Exhibition, 1889; Chicago, 1893. Offices: 4, Eastcheap, London, E.C. *Works: Clifte-on-Thames.*—Tel. No. 132, Avenue.

FARROW & JACKSON, LIMITED.

BY APPOINTMENT TO H.M. THE QUEEN AND H.R.H. THE PRINCE OF WALES.

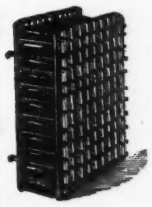
MAKERS OF



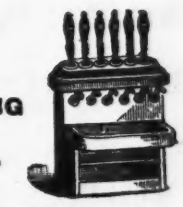
IRON WINE BINS
OF ALL KINDS.
Registered Cellular, with separate rest for each bottle.

BURROW'S "SLIDER" BINS
NOW MANUFACTURED BY

FARROW & JACKSON,



CELLAR AND BAR REQUISITES.
BEER ENGINES AND PEWTERING WORK.
SPIRIT SERVICE AND PIPE, &c.
ESTIMATES FURNISHED.



16, GREAT TOWER STREET E.C., & 8, HAYMARKET, S.W.

VAL DE TRAVERS ASPHALTE

(COMPRESSED OR MASTIC)

Is the best material for Roadways, Footways, Damp Courses, Roofings, Warehouse Floors, Basements, Stables, Coach Houses, Slaughter Houses, Breweries, Lavatories, Tennis Courts, &c. *Full particulars can be obtained from the Offices,*

HAMILTON HOUSE, BISHOPSGATE STREET WITHOUT, E.C.

W. SUMNER & CO. LTD.

DIANA PLACE, 388, EUSTON ROAD, N.W.

HIGH CLASS STEAM JOINERY WORKS

THE TRADE SUPPLIED WITH FITTINGS FOR BANKS, OFFICES, CHURCHES, SHOPS, &c.

SAMUEL WRIGHT & CO.

Are in a position to execute FIBROUS PLASTERING of any quantity or description.

CROWN WORKS, ANDRE STREET, AMHURST ROAD, HACKNEY.

ORNAMENTAL CEILINGS AND CORNICES

GOLD MEDAL, PARIS, 1878.
JUROR, CLASS XXX., INTERNATIONAL EXHIBITION, 1862.
JUROR, CLASS XXVI., GREAT EXHIBITION, 1851.

IN PATENT FIBROUS PLASTER.
In slabs, dry, and ready for fixing.

George Jackson & Sons,
No. 49, RATHBONE PLACE, LONDON, W.
ESTABLISHED 1780.
All kinds of Enrichments supplied in the same material.

PRIZE MEDAL CLASS XV., EXPOSITION UNIVERSELLE, 1867.
PRIZE MEDAL, CLASS X. (c), INTERNATIONAL EXHIBITION 1862.
PRIZE MEDAL, CLASS XXIV., EXPOSITION UNIVERSELLE, 1855.

RED STAR WINDOW GLASS

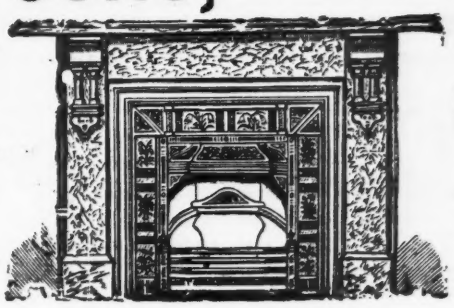
EVEN IN QUALITY FINE IN COLOUR

SESSIONS & SONS, LIMITED, GLOUCESTER.

TIMBER, SLATE, AND

Manufacturers

CHIMNEY-PIECES,
RAILWAY STATION URINALS,
TABLES, SHELVES,
IN PLAIN OR ENAMELLED SLATE,
REGISTER GRATES, STOVES, RANGES.
JOINERY AND MOULDINGS, &c.



BUILDING MATERIAL MERCHANTS,

of all kinds of

BATHS, LAVATORIES,
CLOSETS, SINKS, CISTERNS,
MILK COOLERS, &c., &c.,
MARBLE, STONE, IRON, OR WOOD.
EVERY REQUISITE FOR BUILDING.
(Write for Price Lists).

SPECIAL ADVANTAGES TO PRIVATE INSURERS.

THE IMPERIAL Insurance Company, Limited. FIRE. (Est. 1803), 1, Old Broad-street, E.C. and 22, Pall Mall, S.W.

Subscribed Capital, 1,200,000*l.* Paid-up, 300,000*l.* Total Funds, over 1,500,000*l.*—E. COZENS SMITH, General Manager.

THE VULCAN BOILER AND GENERAL INSURANCE CO., LIMITED.

(Late The Boiler Insurance and Steam Power Co., Lim. The Original Boiler Insurance Company.)

Head Office: 67, King Street, Manchester.

ESTABLISHED 1859.

Subscribed Capital - - £375,000.

Insurance and Inspection of Boilers, Engines, Dynamos, Motors, and other Electrical Plant.

WORKMEN'S COMPENSATION ACT,

Employers' Liability Act, and Common Law.

Personal Accident, Third Party, and Fidelity Guarantee Insurance.

Upwards of 40,000 Boilers and Engines under supervision.

J. F. L. CROSLAND, M.Inst.C.E., M.Inst.M.E., Chief Engineer.

EDWARD HADFIELD, Secretary.

Application for Agencies Invited.

"The Builder" Student's Series.

Crown 8vo, 2s. 6d. post free.

SPECIFICATIONS FOR BUILDING WORKS, AND HOW TO WRITE THEM: a Manual for Architectural Students. By FREDERIC RICHARD FARROW, F.R.I.B.A.

The Chapter on Terra-Cotta by THOS. COOPER, A.R.I.B.A. and that on Electric Wiring, by ALEX. RUSSELL, M.A. (Cantab.), Lecturer to Faraday House, and NEVILLE T. PAYNE, A.I.E.E.

This Manual is written with a view to meet the requirements of the student, to show him how he should write a specification, so that when he has learnt the method and general principles, he may apply them to the particular exigencies of any building he may desire.

"Every architect who takes pupils should insist that they obtain copies."—*Architect.*

"Will prove of service to the architectural student."—*Building News.*

"Full of practical hints and advice—has a good index."—*A. A. Notes.*

"Well fulfils a useful purpose."—*Glasgow Herald.*

"A handy manual—will be found extremely useful in the early days of student life."—*Liverpool Courier.*

Uniform with the above, 5s. post free.

CARPENTRY AND JOINERY: a Text-Book for Architects, Engineers, Surveyors, and Craftsmen (with over 490 illustrations), by BANISTER F. FLETCHER, A.R.I.B.A. and H. PHILLIPS FLETCHER, A.R.I.B.A., A.M.I.C.E.

The Authors have endeavoured to meet the requirements of the craftsman, and at the same time to produce a work that will be useful to the Professional man in the designing of the various structures. They have also endeavoured to consider the desires of those who are likely to become candidates for the examination of the City and Guilds Institute, the Carpenters' Company, and the Institute of Certified Carpenters, &c. Also for the examination in these subjects by the R.I.B.A. and the Surveyors' Institution, &c.

"Can be heartily recommended."—*A. A. Notes.*

"A concise treatise."—*Scientific American.*

"Admirably adapted for its intended purpose."—*Carpenter and Builder.*

"A very useful volume."—*English Mechanic.*

"Thoroughly practical and up-to-date."—*Irish Builder.*

"Of the utmost value to the student."—*City Press.*

London

D. FOURDRINIER, "Builder" Office, 46, Catherine-street, W.C.

BUILDING GOODS (priced).—Required, CATALOGUES all trades, particularly THEATRE FITTINGS SPECIALITIES.—Address, ARCHITECT, P.O. Box 3,136, Johannesburg, S.A.R.

BUSINESSES WANTED & FOR SALE.

FOR DISPOSAL, genuine BUILDER'S BUSINESS, in busy town, 15 miles from London. Good house, shops, stabling for two horses. Stock at valuation.—Inquire, Box No. 130, Office of "The Builder."

DECORATOR'S BUSINESS FOR DISPOSAL. Established 100 years. Same hands 17 years. Good workshops, large house, rising town, half an hour from City. Would suit City decorator as a branch.—J. 7, Brayard's-road, Peckham, S.E.

ENGLISH and FOREIGN TIMBER MERCHANT'S BUSINESS (Provincial).—Including brickyard, lime, cement, and general builders' materials. Will bear strictest investigation on thorough accounts. Established 45 years. In present hands 14 years. Owner retiring.—Address, GENUINE, at Hornecastles', 61, Cheapside, London.

FOR SALE, as a going concern, STAINED GLASS, LEADED LIGHTS, and GENERAL GLASS MERCHANT'S BUSINESS, including PAPERHANGINGS. New and conveniently arranged premises. Excellent opportunity for a practical man.—Apply, F. W. DAVIS, Chartered Accountant (Messrs. Baker & Davis), 36-37, Finsbury-pavement, London, E.C.

BUILDER and DECORATOR'S JOBBING BUSINESS (with good connexion neighbourhood of Fleet-street) TO BE SOLD owing to proprietor's death. Useful plant at valuation. Low goodwill. Fine opening for energetic man.—Apply, EXOR, 18, Rupert-street, Leman-street, Whitechapel.

Refer also to "TOO LATE" *column page* xix.

BILLS OF QUANTITIES, &c.

LITHOGRAPHED CORRECTLY BY RETURN OF POST. A LIBERAL DISCOUNT OFF USUAL PRICES. PLANS BEST STYLE.

ALLDAY, LIMITED.

Shakespeare Press, Birmingham.

INSTITUTE OF SANITARY ENGINEERS (INCORPORATED).

THE NEXT EXAMINATION IN Practical Sanitary Science WILL BE HELD IN LONDON, SEPTEMBER 22nd and 23rd, 1899.

Gentlemen already established in practice in any of the various branches of the sanitary profession are admitted to membership under certain conditions without examination.

Further Particulars of the Secretary.

OFFICES: 63 & 64, CHANCERY LANE, LONDON, W.C.

THE SANITARY INSTITUTE.

LECTURES AND DEMONSTRATIONS FOR SANITARY OFFICERS, MEAT INSPECTORS, AND OTHERS.

The Twenty-eighth COURSE of LECTURES will be held at the Parkes Museum, Margaret-street, W. on MONDAYS, WEDNESDAYS, and FRIDAYS, commencing SEPTEMBER 15th.

The Course includes in addition to the Lectures a number of practical demonstrations and inspections at places illustrative of sanitary practice and administration.

Full particulars can be obtained at the Offices of the Institute, Margaret-street, W.

KING'S COLLEGE, LONDON.—INSTRUCTION for SANITARY INSPECTORS.—The NEXT COURSE in preparation for the December Examination of the Sanitary Inspectors' Examination Board begins on MONDAY, SEPTEMBER 25th. This Course is accepted by the Board as qualifying for admission to the Technical Examination.—For Prospectus and all information apply to the SECRETARY, King's College, Strand, W.C.

SURVEYORS' INSTITUTION EXAMINATIONS.—Complete courses of preparation in class or by correspondence in all divisions and sub-divisions. At the last five examinations the following prizes were obtained by Mr. PARRY'S pupils:—1895 and 1896: Institution Prize, Driver Prize, and Penfold Silver Medal; 1897: Institution Prize and Special Prize; 1898: Institution Prize, Special Prize, Driver Prize, Penfold Silver Medal, and Crawter Prize (one of the two bracketted winners of the last); 1899: Institution Prize, Special Prize, Driver Prize, Penfold Silver Medal, and Penfold Gold Medal (all the prizes but one). MORE THAN HALF of the successful list were Mr. Parry's pupils.—Apply to Mr. RICHARD PARRY, F.S.I. A.M.I.C.E. &c. 27, Great George-street, Westminster (immediately opposite the Surveyors' Institution). Telephone 680, Westminster.

SANITARY INSPECTORS' and PRACTICAL SANITARY SCIENCE EXAMS. of THE SANITARY INSTITUTE. Complete Courses of Instruction by correspondence for these and similar exams. conducted by Gentleman (Engineer, Surveyor, and Sanitary Inspector to Urban District Council) holding three Certificates from San. Inst. 1st Class Honours Medallist, Hygiene, &c. Several hundred successes. Classes for 1899 EXAMS. just commencing.—Apply early for Syllabus of Subjects, &c. to MEM. SAN. INST. Box 195, Office of "The Builder."

SANITARY INSTITUTE EXAMS.—Preparation for the Inspectors' Examination by a system of correspondence needing no Text Books or Acts, by C. H. CLARKE, Assoc.San.Inst.; Fellow Inst. of San. Engineers; Honours Medallist in Hygiene; Member of the Society of Arts and of Société Française d'Hygiène. See Clarke's Aids:—Calculation of Cubic Space, 1s.; Practical Drain Inspection, 6d.; Trade Nuisances, 6d. Others will be re-issued shortly.—Prospectus from 120, Thoroid-road, Ilford, E.

R.I.B.A. EXAMS. — PREPARATION personally or by correspondence, in three, six, nine, or twelve months' courses. ARCHITECTURAL LENDING LIBRARY. Special three months' finishing courses.—For full particulars apply to Messrs. HOWGATE & BOND, Associates R.I.B.A. Perchard House, 70 Gower-street, W.C. (close to the British Museum).

CIVIL SERVICE EXAMINATION announced for ASSISTANT CIVIL ENGINEERS, Admiralty. First and third places at last Examination. Architectural training admitted. Preparation by correspondence or in residence.—MIDDLETON & CARDEN, 19, Craven-street, W.C.

MUNICIPAL and COUNTY ENGINEERS' EXAMINATION.—Mr. RICHARD PARRY, A.M.I.C.E. F.S.I. &c. 27, Great George-street, Westminster, prepares pupils by correspondence for this examination. The course of work may be taken to extend over three, six, or twelve months according to previous knowledge. At the examination of last April out of the 15 successful candidates 12 were prepared by Mr. Parry.

TUITION in PRACTICAL SURVEYING undertaken by a SURVEYOR of over twenty years' experience in the East.—Box 160, Office of "The Builder."

QUANTITIES and SPECIFICATIONS PREPARED from sketch plans, measuring up, and accounts adjusted. Town or country.

Address SURVEYOR, No. 4, Duke-street, Charing Cross, London, W.C.

ABLE ASSISTANCE.

WORKING and DETAIL DRAWINGS, DESIGNS, PERSPECTIVES, TRACINGS, QUANTITIES and SPECIFICATIONS.

DIFFICULTIES OF PRACTICE ADVISED UPON.

F. BRENT, 34, GREAT JAMES STREET, LONDON, W.C.

SANITARY.

F. BOTTING

undertakes all classes of Inspections (town and country) and Surveys for sanitary works, &c.

No. 79, SEYMOUR-STREET, W. (late of 6, Baker-street, W.).

THE URBAN DISTRICT COUNCIL of SURBITON.

WANTED immediately, a TEMPORARY ASSISTANT for about a month. Applicants must be good draughtsmen and levellers, and have had experience in preparing Parliamentary plans.

Salary 3*l.* 3*s.* per week.

Applications, enclosing recent testimonials, to be sent to the undersigned.

SAML. MATHER, A.M.I.C.E. Engineer and Surveyor.

District Council Offices, Surbiton, August 21st, 1899.

COUNTY BOROUGH of WEST HAM. WORKS DEPARTMENT.

The Council invite APPLICATIONS for the APPOINTMENT of CHIEF CLERK and INDOOR ASSISTANT MANAGER, at a salary of 250*l.* per annum, rising by two annual increments of 25*l.* to 300*l.*

The person appointed will be under the direction of and responsible to the Works Manager.

Shorthand and typewriting are essential, and candidates must possess a good knowledge of the building trade and material markets.

The duties will comprise technical correspondence, obtaining quotations for and ordering plant and materials, and the general clerical work and control of a contractor's office and indoor staff.

Canvassing members of the Council will be considered a disqualification.

Forms, upon which application must be made, may be obtained at my Office, and the applications must reach me not later than FRIDAY, 1st SEPTEMBER, 1899.

By order of the Council, FRED. E. HILLEARY, Town Clerk.

Town Hall, West Ham, E. August 16th, 1899.

CITY of BRADFORD. CITY SURVEYOR'S DEPARTMENT.

ARCHITECTURAL ASSISTANT.—ENGINEERING ASSISTANT FOR TRAMWAYS.—CLERK OF WORKS FOR BUILDINGS.

APPLICATIONS are invited for the following APPOINTMENTS:—

CHIEF ARCHITECTURAL ASSISTANT in the City Surveyor's Department, at a salary of 200*l.* per annum;

A fully-qualified ASSISTANT, experienced in electrical tramway work, and well up in track construction and overhead equipment, at a salary of 150*l.* per annum;

A CLERK of WORKS to supervise the erection of new buildings belonging to the Corporation, at a salary of 120*l.* per annum.

List of duties may be had on application to Mr. J. H. COX, the City Surveyor. Applications, in handwriting of candidates, stating age, experience, and qualifications, and accompanied by three recent testimonials, to be sent to me on or before TUESDAY, the 5th of SEPTEMBER next.

FREDERICK STEVENS, Town Clerk.

Town Clerk's Office, Bradford, August 17th, 1899.

COUNTY BOROUGH of HALIFAX.

The Improvement Committee propose to APPOINT Two BUILDING INSPECTORS, at a salary of 100*l.* per annum each.

Applicants must have a thorough knowledge of buildings and drainage, and be able to commence duties on 2nd October next. Particulars as to duties can be obtained at the Borough Engineer's Office.

Applications, in candidates' own writing, with copies of not more than three testimonials of recent date, and endorsed "Inspector," to be sent to the Town Clerk's Office, Town Hall, Halifax, on or before the 4th SEPTEMBER, 1899.

BERMONDSEY VESTRY.

The Vestry invite APPLICATIONS for the position of GENERAL FOREMAN, to supervise and instruct (under the Surveyor) the whole of the workmen employed by the Vestry, and to carry out all such instructions and orders as may from time to time be given to him by the Surveyor.

Only those who have held a similar appointment need apply.

Salary 3*l.* per week, without pension.

Applications from persons between the ages of 30 and 45, giving particulars of former employments, and accompanied by copies of not more than three testimonials, must be endorsed "Foreman," and received by the undersigned on or before NOON on the 6th SEPTEMBER.

The person appointed will be required to live in the Parish.

Canvassing either personally or otherwise will disqualify.

FREDK. EYALL, Vestry Clerk.

Bermondsey Town Hall, Spa-road, S.E. August 18th, 1899.

DRAUGHTSMAN WANTED for a temporary appointment in London. One who has had experience in electric light station work preferred.—Address, stating age, experience, and salary required to Box 295, Office of "The Builder."

DRAUGHTSMAN (first-class) Required at once. One used to preparing working and detail drawings, specifications, and the usual routine of professional assistance. Permanency if suitable.—Reply, with references, experience, age, and salary expected, to Box 134, Office of "The Builder."

DRAUGHTSMAN (competent) Wanted immediately for temporary engagement.—Write, stating salary, &c. to H. BELCH, Architect, Cheaham, Bucks.

DRAUGHTSMAN WANTED by firm of Engineers. Experienced in builder and joiner's work. State age and wages.—Reply to Box 44, care of C. Mitchell & Co. 12 and 13, Red Lion-court, Fleet-street, E.C.

ARCHITECTURAL DRAUGHTSMAN (Experienced) WANTED. Write, stating full particulars of past experience, age, and salary required, to H., 230, at Shelley's, No. 38, Gracechurch-street, E.C.

DRAUGHTSMEN.—Two IMPROVERS WANTED in London.—Apply by letter, stating age and full particulars of education and training, to BLACKMAN VENTILATING CO. Ltd. 63, Fore-street, London, E.C.

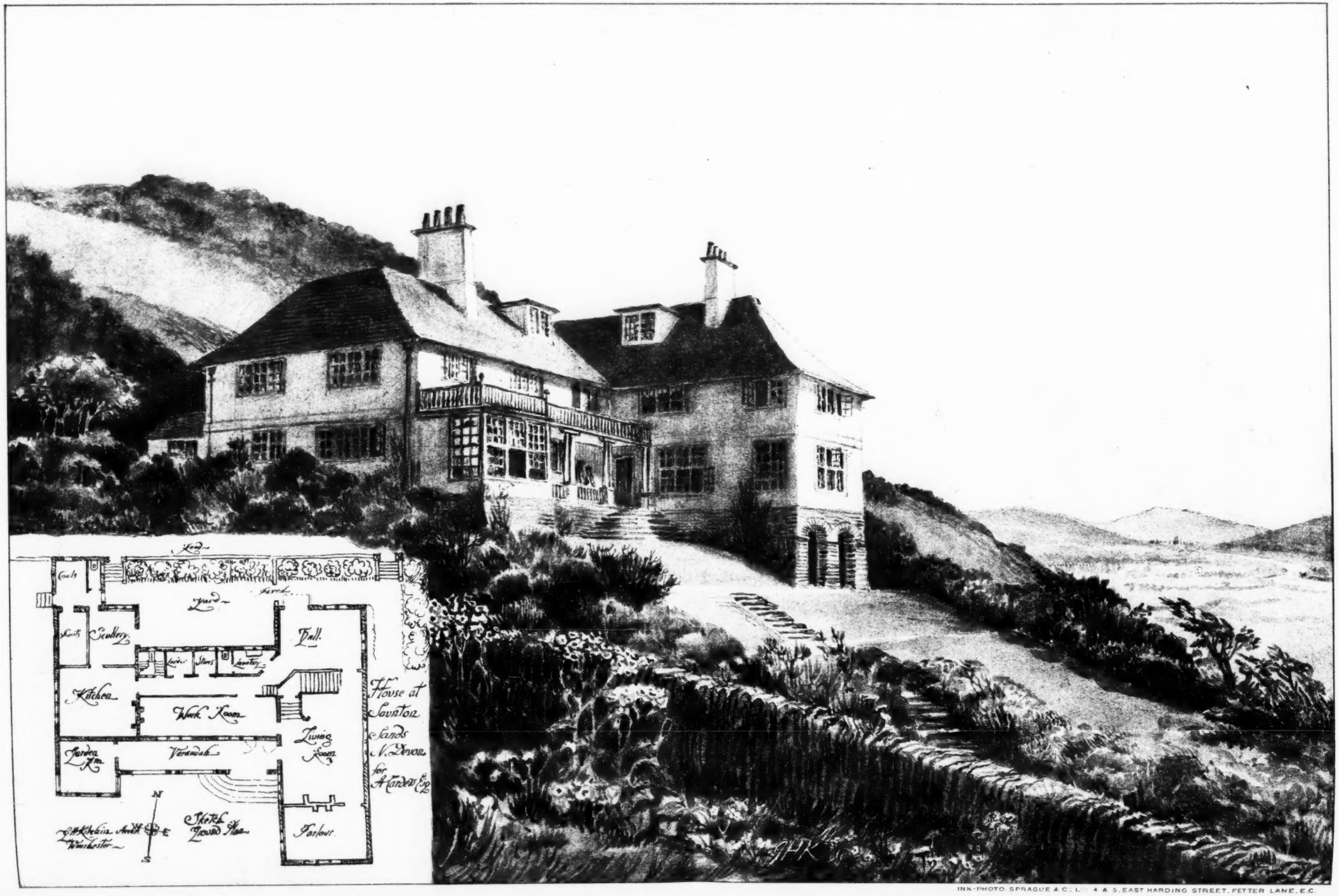
TO ARCHITECTS and OTHERS.—The Trustees of property in High-street, Worcester, REQUIRE services of ARCHITECT to PREPARE PLANS, SPECIFICATIONS, and ESTIMATES for PULLING DOWN and REBUILDING THREE SHOPS.—Space, particulars, &c. from J. K. WOODWARD, Halstead, Essex.

ESTIMATING CLERK WANTED in Builder's and Decorator's office. Plans, specifications, and quantities, and general routine. State age and salary required, to Box 285, Office of "The Builder."

WANTED, in CITY SURVEYOR'S OFFICE, SHEFFIELD, ENGINEERING ASSISTANT. One with knowledge of tramway work preferred. Salary 160*l.* per annum.—Apply, on official form, to be obtained on application to undersigned, not later than SEPTEMBER 9th, to CHARLES F. WIKE, M.Inst.C.E. City Surveyor, Town Hall, Sheffield.

ASSISTANT WANTED by firm with good practice in Midlands. Good salary to capable and suitable man.—Apply, stating age, experience, and references, Box 289, Office of "The Builder."

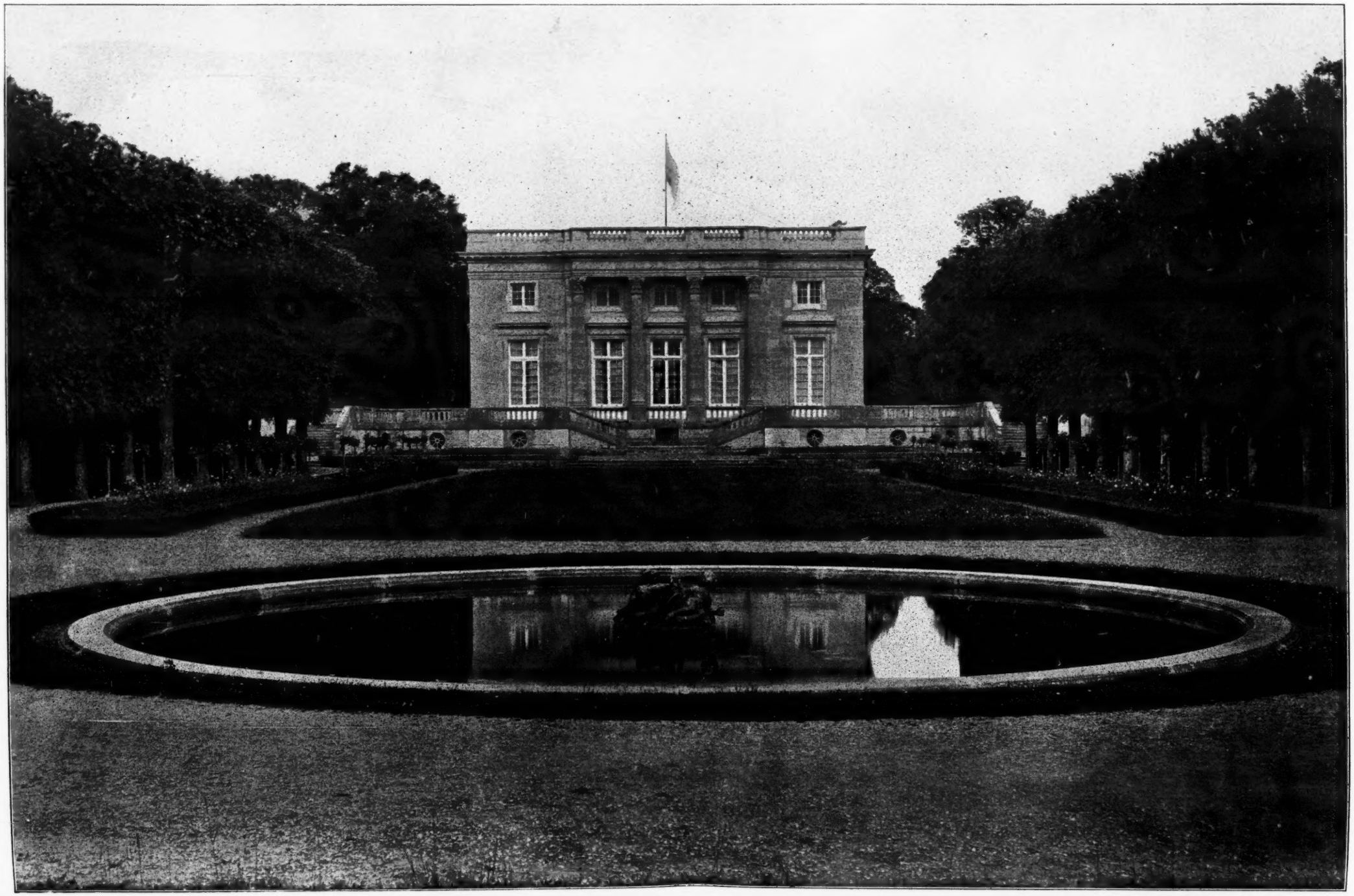
ASSISTANT CHEMIST on a Cement Works WANTED. Night work. Must know how to analyse cement, clay, chalk, slurry.—State salary required and experience, G. & T. EARLE, Ltd. Wilmington, Hull.



INK-PHOTO. SPRAGUE & C., L[illegible] 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

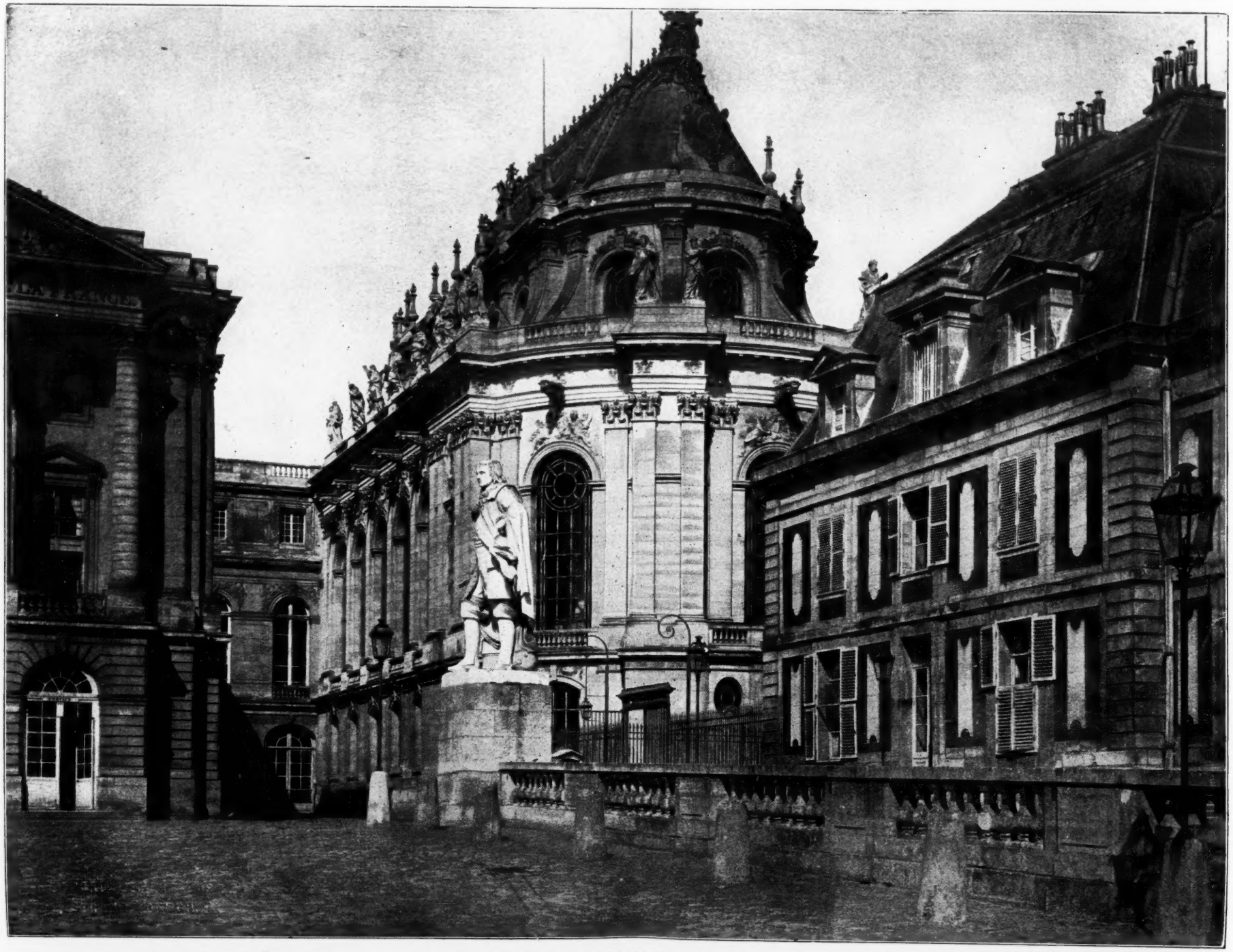
INK: PHOTO SPRAGUE & CO. LTD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

GENERAL LIBRARY,
UNIV. OF MICH.
SEP 7 1899



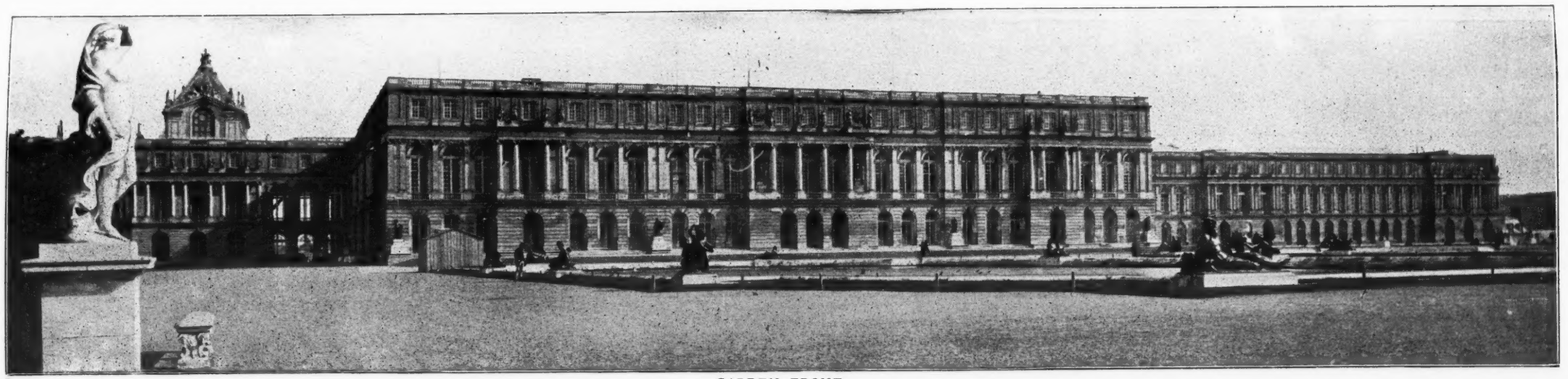
THE PETIT TRIANON, VERSAILLES.

THE PETIT TRIANON, VERSAILLES.

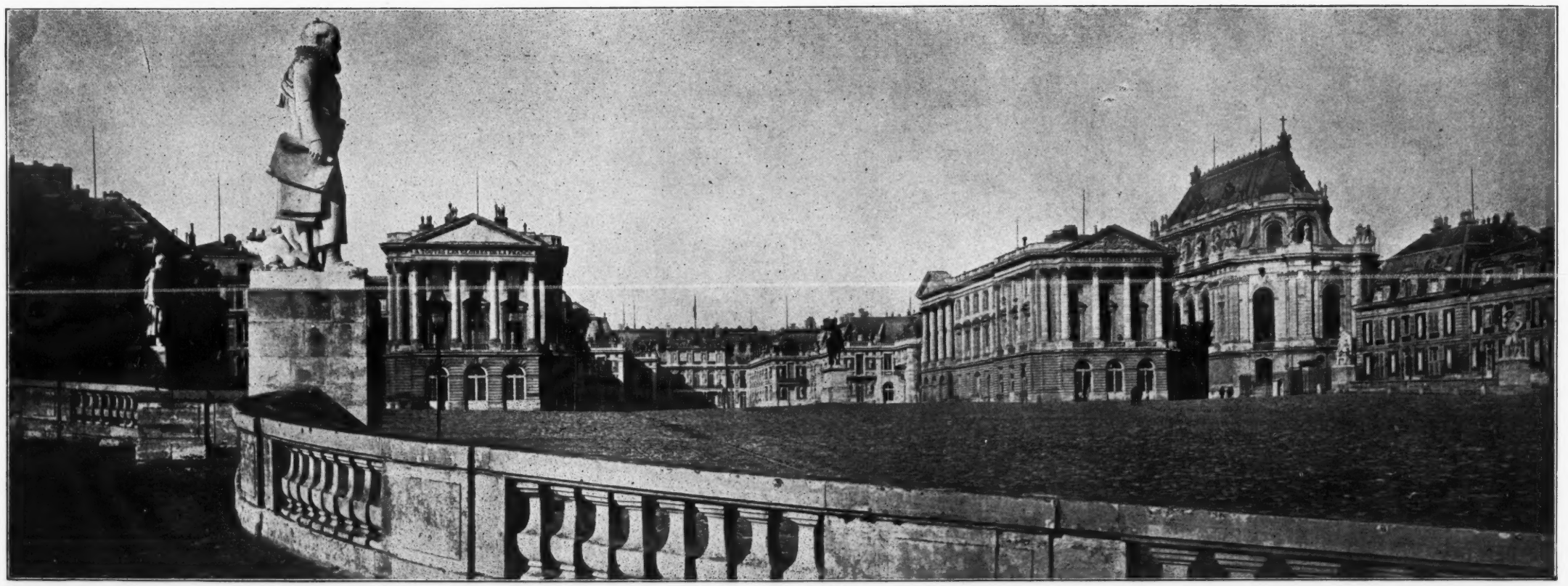


THE CHAPEL, VERSAILLES: EXTERIOR.

THE CHAPEL, VERSAILLES: INTERIOR.



GARDEN FRONT.



ENTRANCE FRONT.

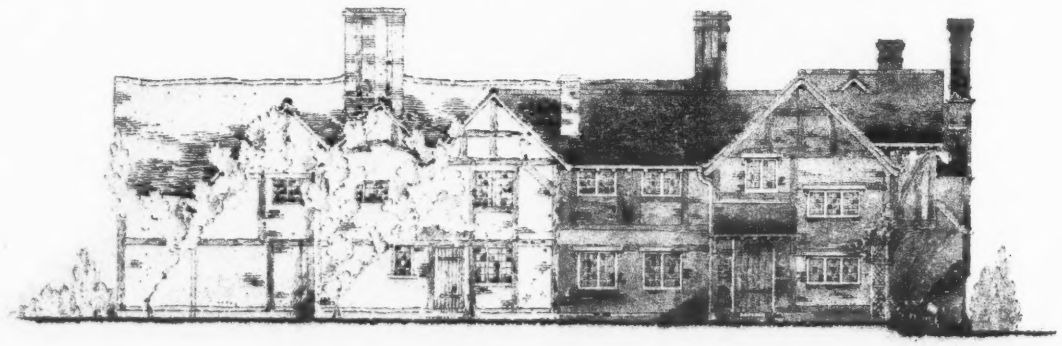
THE PALACE, VERSAILLES.

GENERAL LIBRARY,
UNIV. OF MICH.
SEP 7 1899

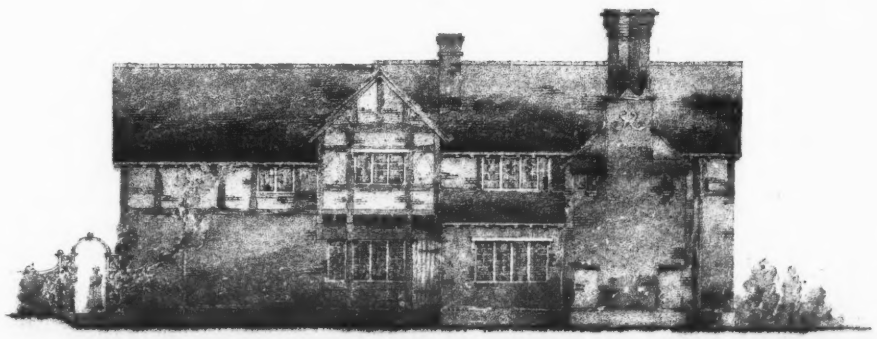
SKETCH OF HOUSE BEFORE ADDITIONS

WAXWELL FARM PINNER

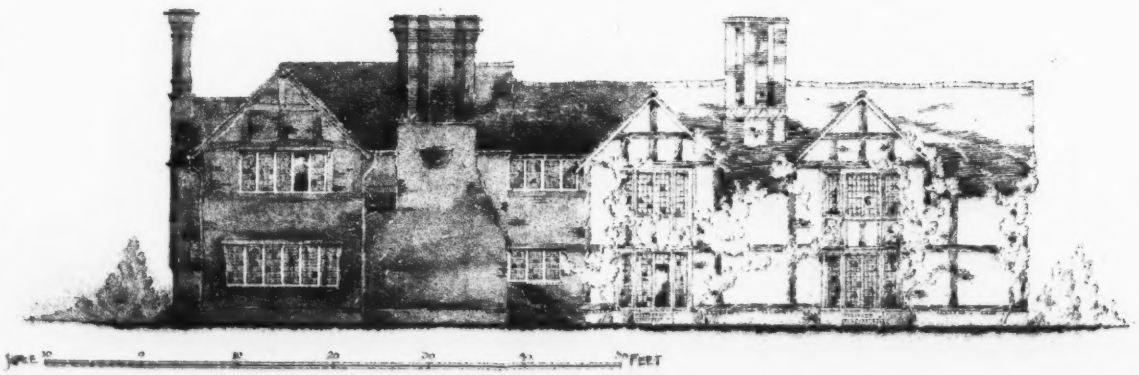
ADDITIONS for EDWARD TROTTER Esq



NORTH ELEVATION

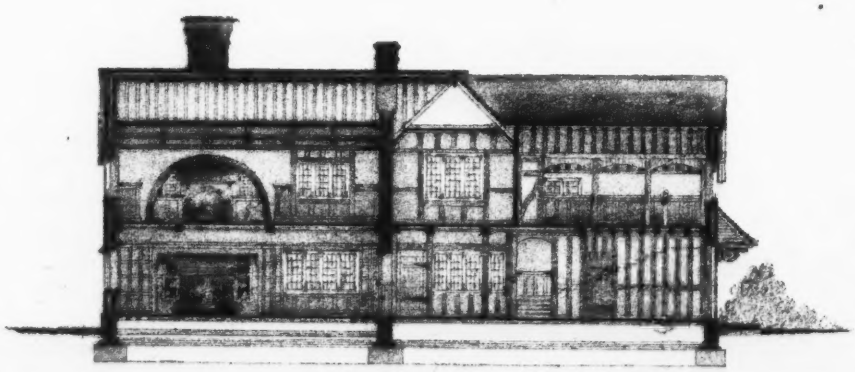


WEST ELEVATION



SCALE 10 0 10 20 30 40 FEET

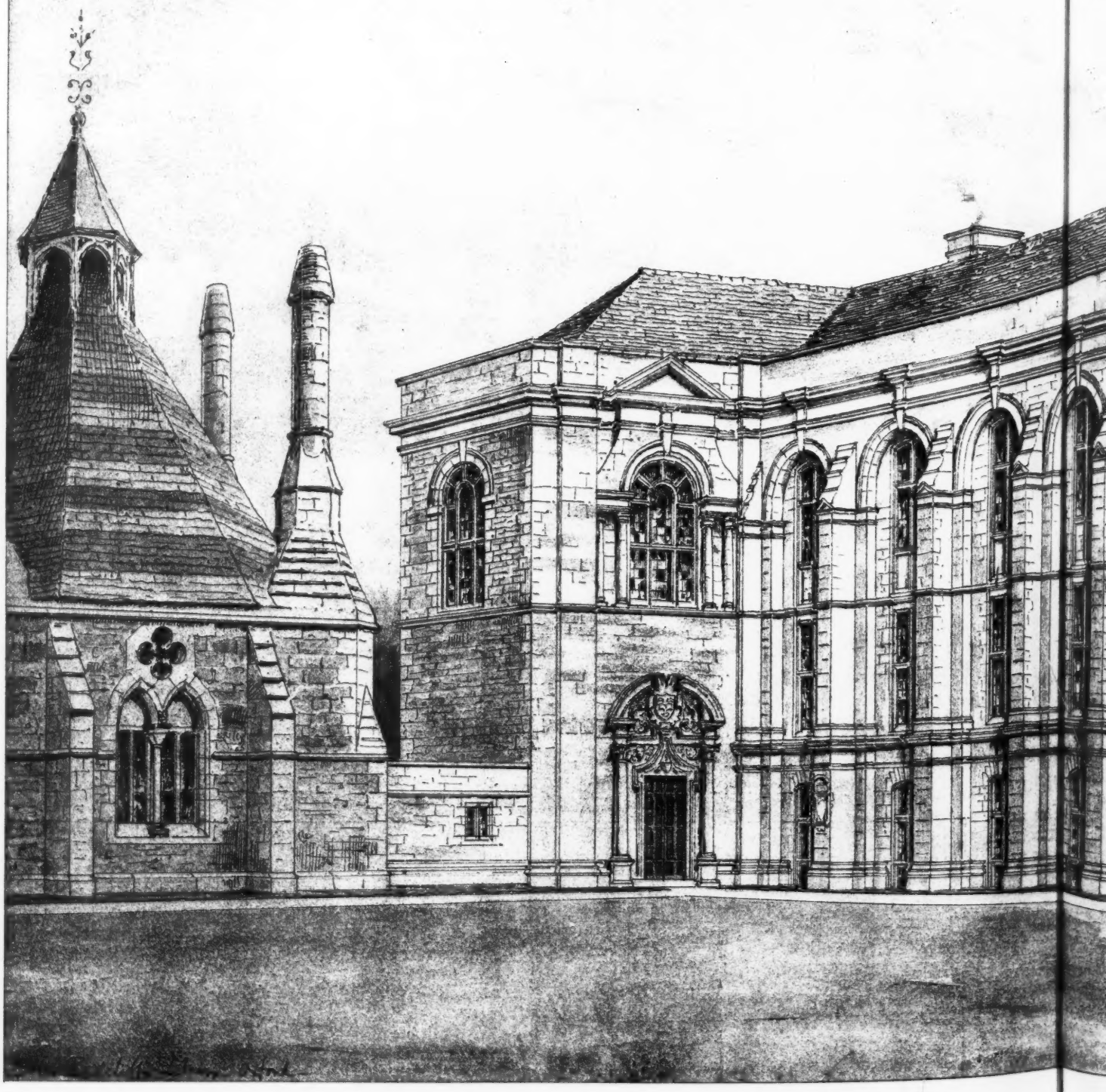
SOUTH ELEVATION



LONGITUDINAL SECTION

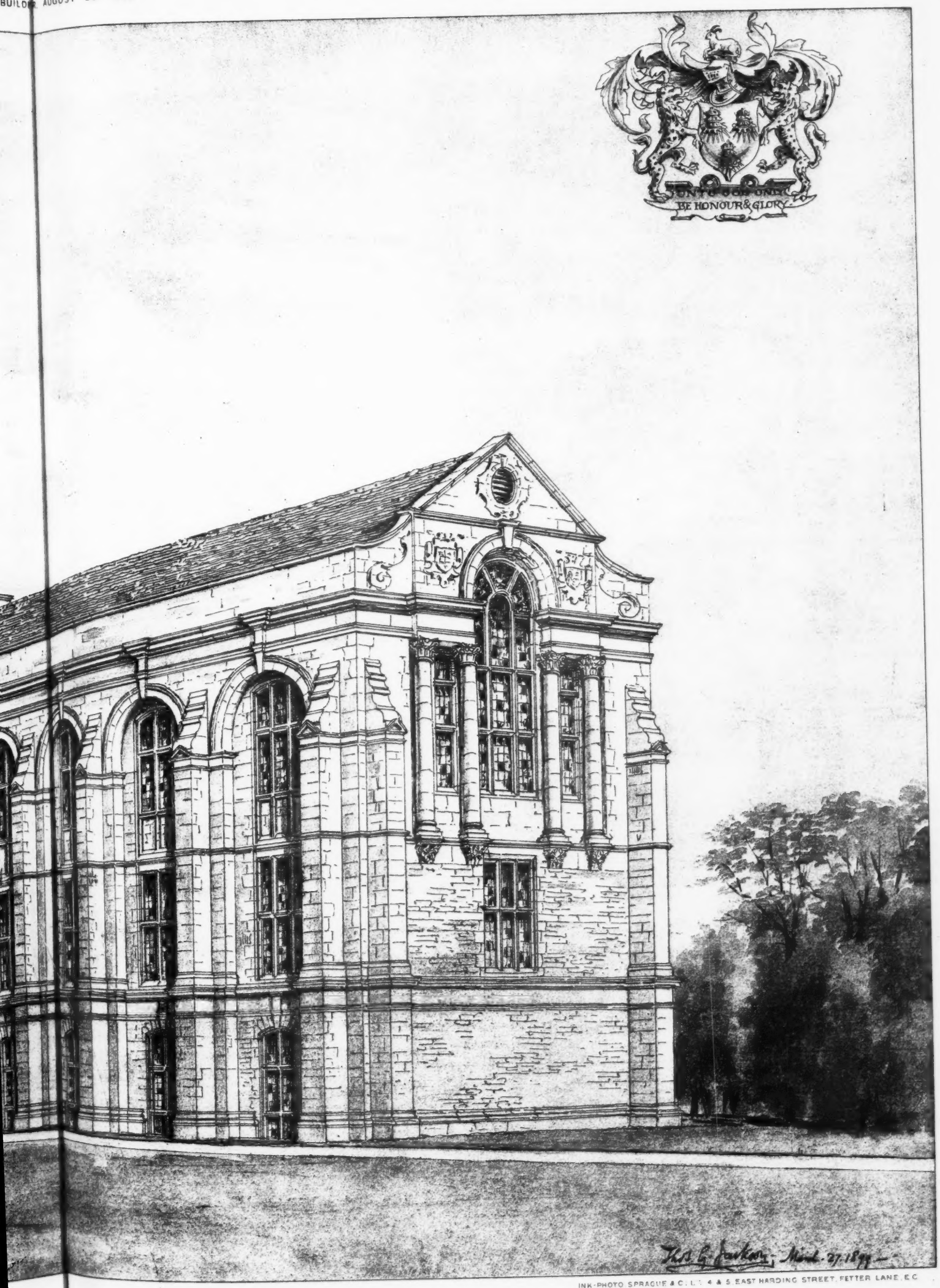
W. Howard Lee, Architect

INK-PHOTO. SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



NEW RADCLIFFE LIBRARY, OXFORD.—MR.

GENERAL LIBRARY,
UNIV. OF MICH.
SEP 7 1899



INK-PHOTO SPRAGUE & C° L^TD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

ARY, OXFORD.—Mr. T. G. Jackson, R.A., Architect.